The Monist

Edward C. Hegeler, Hegeler Institute

THE MONIST

A QUARTERLY MAGAZINE

DEVOTED TO THE PHILOSOPHY OF SCIENCE

VOLUME XVIII.

CHICAGO
THE OPEN COURT PUBLISHING COMPANY
LONDON AGENTS
KEGAN PAUL, TRENCH, TRÜBNER & CO., LTD.
1908

CONTENTS OF VOLUME XVIII.

ARTICLES AND AUTHORS.

BOOK REVIEWS.

VOL. XVIII. No. 4. OCTOBER, 1908.

THE MONIST

A QUARTERLY MAGAZINE

Devoted to the Philosophy of Science

Editor: DR. PAUL CARUS. *Associates:* { E. C. HEGELER. MARY CARUS.

CONTENTS:

CHICAGO
THE OPEN COURT PUBLISHING COMPANY
1908

COMPLETE INDEX

OF

THE MONIST

COMPRISING ALL CONTRIBUTED AND EDITORIAL ARTICLES ARRANGED BY AUTHOR AND TITLE IN ONE DICTIONARY CATALOGUE

VOLUMES I-XVII
1890-1907

CHICAGO
THE OPEN COURT PUBLISHING CO.
LONDON AGENTS
KEGAN PAUL, TRENCH, TRÜBNER & CO., LTD.
1908

INDEX TO THE MONIST.

VOLUMES I-XVII.

VOL. XVIII. JANUARY, 1908. NO. 1.

THE MONIST

WILL-FORCE AND THE CONSERVATION OF ENERGY.

THE following essay contains an argument which, I believe, has never yet been stated by any one else—much less refuted. Once I did publish it in the January number of *The Monist* for 1899; but I was completely misunderstood by the Editor, Dr. Paul Carus. My reply to him came late; and was not published. In offering this argument now for publication, I throw down the gauntlet to the whole philosophic world, especially to Prof. Ernst Haeckel of Jena, whose recent famous publication briefly sums up the pronouncements of nineteenth century science on the opposite side.

* * *

To me it has always seemed that there is absolutely no escape from the conclusion that consciousness—or the conscious principle in man and animals—actually does, ever and again, originate energy.

There are two main steps in the argument by which this theory is established.

1. Mind *directs* the motions of matter. This theory has been disputed by some leading intellects, more scientists than philosophers, notably Professor Huxley, who boldly maintained that the mind was a mere spectator of all that occurred around it, and was powerless to interfere. To others, such as Tyndall, the problem has remained a

standing puzzle. But I think most are now gradually coming round to the view that mind does direct the motions of matter. And perhaps what has chiefly led to this is, that without this theory there seems to be no foundation for the ethical idea—ethics ceases to be a science. If all movements are determined by purely mechanical or physical causes there is no room for any question of right or wrong. If all the internal and external movements of animal bodies were entirely independent of consciousness, and would go on just the same if consciousness were not involved, then there is an end of all moral responsibility. Of course this is only an indirect argument. And I think there is no direct proof of the theory. We can only argue, "for if not, if it be possible, suppose that consciousness does not direct motion," and then see if the alternative conclusions thus presented are such as we can swallow. The disappearance of the distinction between right and wrong is one of the first conclusions. Possibly two or three logical fanatics might be found who would not stick even at this. But I think it safe to say that there is not the smallest possibility of any such theory ever becoming more than a curiosity.

Another indirect argument is simply this—can we possibly believe that all that has ever happened and is happening among conscious beings in this world, would have happened and would go on happening exactly the same, if consciousness was not and never had been present. If animals were unconscious creatures would the daily and yearly events of their lives be exactly the same? You can't prove that they would not be by *Barbara* or by anything else. But the fact remains that the alternative conclusion is absurd—what then would be the function of consciousness, what the use of it? None! Well you would never get anybody but a few logical monomaniacs to believe that.

The direct argument is not conclusive. And yet perhaps it is as conclusive as the indirect one. The direct argument is simply—All conscious beings are conscious of controlling events; if this consciousness has no foundation in fact, how do you explain it? And the answer is that it is quite capable of explanation. So long as that which happens is that which we desire, we infer that it is our desire that has brought it about; when it is not what we want, we attribute it to external causes.

But I think there is an answer to that. Reckoning numerically, the vast majority of all the movements of the body which are accompanied by consciousness are just what we desire—unless a man be diseased by paralysis or drunkenness, or catalepsy, or something of that sort, his arms and legs never fail to do the hundreds of little things that he is continually wanting them to do, all day long.

But, it will be said, our actions are the result of ingrained habit—the result of certain tendencies inherent in the physical constitution of the body. And our sense of desiring them is really merely the sense of pleasure that comes from doing what our bodies are especially made to do—the sense of pleasure that always more or less forms part of the performance of any natural and healthy function, or even sometimes of morbid activities that have become habitual.

But that argument can easily be met. Let us rigidly exclude any and all activities that are habitual. Let us select any actions quite arbitrarily—actions, not activities. Think for a moment—"I will move my arm or leg, this way or that," and you find you can do it. Can we possibly attribute each one of these instances to a mere coincidence that the motion of the arm or the leg happened to occur just at the same time as the desire for that motion?.... Really I think this is the strongest argument of all. It is not the direct argument with which we started. The direct

argument, "I desire this movement—this movement occurs—therefore my desire is the cause of it"—may be said to have failed. Because, theoretically, there is an alternative conclusion. But that alternative conclusion presents, surely, the biggest indirect argument—the strongest *reductio ad absurdum*—that it would be possible to find anywhere. If there is a stage at which the probabilities of the indirect form of argument become as good as the certainties of a direct one, it is surely here.

The reply, if any, could only be, that it is only through illusion that the movement appears to follow the desire; and that, as a matter of fact, it is the desire that follows the movement—the desire being, really, a mere consciousness of and pleased acquiescence in the movement. But then, I say, try the experiment as often as you like; determine on the movement a measurable time beforehand, so as to be sure that it is the movement that follows the desire, and not *vice versa*. To which you might perhaps reply, "Again illusion. The desire which appeared to you to determine the movement, was really itself determined by the same unseen, internal, previous causes, which determined the movement."—Well it is a conclusive answer to that argument, if, instead of trying to pre-determine the movement yourself, you let somebody else determine it for you. That effectually eliminates all possibility of illusion. Physiological causes internal in you could not have determined in the other person's mind the choice of what movement you should make.

But besides all that—even when you pre-determine the movement yourself, why suppose illusion? The evidence of our senses is all that we ever have about anything at all. And generally speaking we think it right to accept it. You must then have some especial reason in this case for imagining that there is illusion at work.

And *that* is the point. You have a special reason, all you scientists, for rejecting the evidence of your senses in this case. And that reason is the conservation of energy. That mind can direct the motions of matter appears to you to be the contrary to the theory of the conservation of energy; hence your obstinate objection to the theory of the conscious control of motion.

Now this theory of the conservation of energy is an invention of the day before yesterday. And yet all you scientists will accept any alternative however extraordinary, rather than give it up. You will deny the existence of moral responsibility, and you will believe that all conscious beings are mere machines, and that consciousness is without any function or use in life, which could get on just as well without it, and you will reject the daily experiences of all mankind from the earliest times up to now, and will tax your brains to invent all kinds of extraordinary hypotheses to provide a way out of the difficulties that you yourselves have created out of your adherence to this pet new theory, rather than allow this one exception to it. Such is the pride of intellect!

If anything had to go to the wall, it would be this newfangled theory of the conservation of energy. But I will show later on that you may still keep your theory if you like, though in a somewhat modified form, and may admit the plain evidence of your senses as well.

I think, however, as I said, that the opinion that mind directs the movements of matter, is steadily gaining adherence among men of science to-day. They do not give up the conservation of energy; but they try all sorts of intellectual gymnastics to try and reconcile the two theories.* I hope to make the feat an easier one for them. Meanwhile, after what I have said, I think we are justified

* See Prof. Lloyd Morgan in the October number of *The Monist* for 1896, in an article on "Animal Automatism and Consciousness," about which the less said the better.

in taking the former theory as practically proved. Mind directs the movements of matter.

Now for the next step. How does it do so? Here I issue my challenge:

2. There is one very evident, and very simple way, in which, we can easily see, that mind might direct the movements of matter.

Suppose a certain single, simple movement of a certain material body has been completely pre-determined by certain mechanical causes—that is, by certain previous movements of that and other material bodies; and suppose that after this material body has started on its mechanically predetermined career, some conscious being observing the event suddenly perceives that, from a human point of view, it is a matter of tremendous importance that the motion of that particular material body should receive a certain particular change in direction. What then is the role of consciousness? How can it interfere to avert the mechanically predetermined result, or, to bring about a result predetermined in consciousness. Some, second, additional, different motion must be added to the motion of the material body such that the resultant of the two will cause the body to move in the required direction. And—this is the point—in order to effect the desired object, this second motion must be completely predetermined by consciousness and cannot be the mere mechanical resultant of previous material motions. If it had a purely mechanical origin it might go in the wrong direction, and the catastrophe would not be averted, or, the desired result would be missed. The second motion, which is designed to impart to the body a certain direction pre-chosen by consciousness, must be entirely determined in direction by that consciousness, and must therefore be an initial motion dating solely from that consciousness—originating solely in it,—and having no previous mechanical history. If its direction

is pre-determined by consciousness, then it is not pre-determined by mechanics, and it bears no relation whatever to any previous mechanical movements. If its direction is pre-determined by previous motions of matter, then it bears no relation to consciousness.

In this way consciousness could direct the movements of matter. And there is no conceivable other way.

This conclusion—the primary causation of material motion, that is of energy, by mind—is one against which leading scientists of strong anti-spiritualist prejudices have fought and struggled heroically. But it is a conclusion which is forced home—a conclusion from which there is no escape. Nowadays they are some of them beginning to admit that consciousness directs motion; but they try all sorts of maneuvers to show that this is possible without the origination of motion from any source outside the closed circle of mechanical cause and effect. But these efforts are futile. There is no standing ground between the two positions. If consciousness directs a motion, it does so by originating another motion. There is no other way. If consciousness cannot originate motion, then it does not direct motion. The scientist is thrown on to the horns of a dilemma. He must allow that consciousness can originate motion; or he must be satisfied with a purely mechanical explanation of the entire behavior of all conscious beings. There is no wriggling out of the position. And those scientists who have gone as far as to allow that consciousness does direct events, must go the rest of the way, and allow that consciousness originates motion; or, they must go back.

In using here the terms "mechanical energy" and "mechanical cause and effect," I do not of course mean to say that the energies of the human body which are directed by the conscious principle are simply mechanical like the energy of a billiard ball due to its motion across a table.

I merely mean to say that the problem of directing energy of any form whatever is essentially the same as the problem of imparting a given change of direction to the simple mechanical movement of any mass. Of course the simple mechanical motions of masses have in all cases their immediate cause in some form of physical energy, such as heat, light, electricity, gravity, or muscular, or nervous energy. But in every attempt to effect a given change of direction in the simple mechanical motion of a body without originating an independent motion, there is the same inherent absurdity, whether it is sought to make this change by direct action on the body whose mechanical motion is to be changed, or by introducing some change in the previous physical causes of that motion. By attempting its task further back among the previous physical causes which lead up to the motion which it is desired to change, the conscious principle may obtain a certain mechanical advantage. But the difficulty is one which it is essentially impossible to avoid entirely. It is inherent, and not to be avoided by any maneuvering.

There, in brief, is my challenge to the philosophical world. What I have to say now is merely in further explanation and illustration of my theory, and to round it off, and attempt to show its place in cosmical philosophy.

* * *

I said I would try and help the scientist to reconcile the origination of motion by mind with the theory of the conservation of energy. Well, this is my attempt.

There *is* something that offends the reason in the idea of force having any beginning at all—or in anything having a beginning. Creation out of nothing is an absurdity. In this case, however, force does not appear suddenly out of nothing, but out of consciousness. The truth must be then that force exists in the universe in two forms, viz.,

in association with consciousness and in association with matter. In the former form we have no measure of it at all, as it does not appear at all to our physical senses. But the reasonable inference that it exists, is, nevertheless, valid. When changing from the one form to the other, it would be manifest to our senses, but that it is so small in amount that no physical sense is delicate enough to perceive it. Here again our knowledge of its existence rests upon pure reason, but is not the less positive. This earth's store of energy measurable in foot-pounds is thus ever receiving additions. They may be so small as to make practically very little difference; but they are nevertheless real and definite.

The theory of the conservation of energy is therefore not wrong, but it requires re-modeling. The total amount of energy in the universe is constant, but it is also infinite. It exists in two forms, (1) spiritual, and (2) material, or mechanical; that is, measurable in terms of matter and motion. Reason shows that spiritual force is constantly passing into material force. But if the total quantity of each throughout the universe is infinite, then this incessant transformation will make no difference to either.

The total supply of spiritual force in the universe must be infinite; otherwise it would be liable to exhaustion. The total amount of material energy, too, is also probably infinite. For it seems unreasonable to suppose that the process of transformation ever had a beginning in time.

With regard to the conservation of material energy considered by itself, the old theory is right in the main, but it states a little more than there is warrant for. When altered as far as is necessary to reconcile it with psychical causation, it is reduced to this—not that material energy has no beginning and no end, but merely that it has no end. Once started it can never be lost. It is indestructible; but, though indestructible it may change form, whilst still re-

maining material energy. It may change from kinetic—energy that causes motion in matter, to potential—energy in equilibrium and resulting in stillness. And, what is more, when left alone it seems to have a natural tendency in this direction. And nothing but the interference of will-force can entirely defeat this tendency. The amount of will-force in the universe necessary to continue forever upsetting this tendency to equilibrium must be infinite. The conception of the conservation of energy which represents it as a perpetual motion machine is wrong. There is no such thing as a system in perpetual motion without perpetual interference from without. Motion in any system however large tends eventually to equilibrium. Even in an infinite system this would be so, if the system were purely mechanical; for there might, quite possibly, exist an infinite mass of matter in a state of equilibrium. And without interference from a realm outside of mechanics it is to that end that the mechanical motions of an infinite system would ever tend.*

* * *

Another circumstance which, with very many persons, tends to obscure the fundamental principle of voluntary action is that indirectness in the methods of consciousness, to which we have already referred. Consciousness always operates in the body, through a long chain of events. If it is simply a case of a limb to be moved, the initial motion is not imparted to the limb, nor yet to the muscles that work it. The energy stored up in the muscles of a man's arms and legs comes from the food that he eats. It is set free by something of the nature of an electric current, proceeding along his nerves to his muscles. The electric current is started by some molecular movement in his brain. And the molecular movement may be started by

* The main idea of this paragraph is taken from Professor Ward's Gifford Lectures and from an article by Heysinger in *The Monist* for July, 1904.

an atomic movement. But all that does not invalidate the proof of the existence of an independent will-force. Right back of the whole physical process—somewhere in the brain of the man—there must be an initial motion which is wholly predetermined in direction and velocity by the conscious principle. Otherwise there would be absolutely no guarantee that the ultimate movements would be in the direction forechosen by consciousness. It may be the motion of a certain molecule of the brain—or, of some submolecule—or, simpler even than that, of some atom—or, of a particle of the ether,—or, an electron, whatever that may be. But the initial motion must *be*.

Let it be clearly understood that I do not say that motions that are directed by consciousness must be originated by consciousness. But I do say, that in order to direct one motion, consciousness must originate another. It is sufficient to originate a motion very much smaller than the one to be directed. Consciousness acts as a spark to a train of gunpowder. In the gunpowder you have certain enormous forces in equilibrium, and therefore resulting in stillness. The spark contains a tiny amount of energy, just sufficient to upset the equilibrium when properly directed. And thus the enormous forces are let loose. The energy that releases the locked forces, may be ever so small, but it cannot be *nil*; it must be something definite in amount. To take another illustration: Imagine a mass of boulders, piled mountains high, reaching up out of the sea, and all just exactly in equilibrium. The slightest movement communicated by the surrounding air, the beat of a bird's wing flying over, or the mere sound of a voice—would be sufficient to upset the whole mountain, and send its boulders all thundering into the sea causing great waves sufficient to wreck ships. As a matter of fact, it is believed by mountain dwellers all over the world, that the sound of a voice is sufficient to start an avalanche on the

side of a snow-covered mountain. But in each case, the releasing energy, however small, is yet, of some definite magnitude.

I think perhaps the best analogy is found in the steam steering gear of an ocean liner, or a man-o'-war.* The touch of a babe's little finger might decide whether all the thousands of tons of matter and tons of explosives, and hundreds of human lives, are to go smoothly on their way, or hurtling to destruction. Suppose the engines to be of some ideally perfect pattern, such that they do everything for themselves, and every mechanism throughout the ship so perfect that the whole crew can be dispensed with—except the man at the wheel, and imagine him to be invisible—and you have something somewhat analogous to the mechanics of human action. Examine such a ship. Begin with the big limbs that do the main work of the body—the screw-propeller, and the machinery that drives it, and the power that moves the machinery. Throughout all, the mechanical connections, mechanical cause and effect—using the term mechanical in a wide sense to denote all material motion—are perfect. The power is traced to the coal that the engine eats and the water that it drinks—the pressure on the piston is experimentally proved, and the source of it ascertained—and the connection from piston to screw-propeller perfectly mapped out. But then we come to the steering gear. And here everything points to the control of big forces by smaller ones properly directed. The big rudder is seen to move and turn the ship. The rudder is seen to be controlled by machinery that is worked by an engine whose source of power is the same as that of the engine that works the propeller; but it is a much smaller engine. Then it, in its turn, is found to be controlled by other machinery, which leads us up at last to the

* I am indebted for the idea of this analogy to an article which appeared in *Indian Engineering* some time ago.

steering wheel, and that appears to move by some other source of power which we cannot find. And then it is seen how the faintest movement of that wheel changes the course of the whole ship one way or the other. We repeat this process experimentally ourselves—touch the wheel lightly with a finger and watch the great ship move in response—just as we might touch the cortex of the brain with an electric current, and watch a responsive movement in the body. But the source of the minute energy that moves the wheel eludes perception.

Then let the man at the wheel be visible; and let us examine him;—and in the end we are no nearer the thing sought for. Smaller in amount than even the energy in the finger that touches the wheel, is the energy originated by consciousness in the brain that directs the nerve that moves the muscle of the finger. And thus is man, the weakest of all animals, gaining the conquest of the world.

There is something magnificent in this spectacle of the power of the mind—the effects of the energy originated by consciousness—so tiny in amount, and so tremendous and far-reaching in result. We cannot see it, but we *know* by reason that it must be there,—the little *deus ex machina*. What an economy there is here. It is simply its smallness that has made scientists so persistently refuse to believe in it. The whole process *appears* to be mechanical. The infinitesimal stranger* that just makes all the difference, and without which the whole process would be impossible —escapes the ken of science. It reminds one somewhat of the action of a speck of impurity in zinc immersed in acid. The speck remains unchanged itself, but it is sufficient to start an electric current, which could not be produced if the zinc were perfectly pure. The speck disturbs the equilibrium.

* This expression and the analogy that follows are borrowed from another article in *Indian Engineering*, by a Mr. Ewbank.

The foregoing description of the methods of consciousness provides one example of the part played by unconscious material energy in the animal body. Under the direction of the mind, the material energy of the muscles does all the hard work; it is the *cooli* of the mental powers. But there are muscular and other material energies in the body which appear to have little or no connection with the mind at all—which appear to work away and produce important results without any mental control. I have already briefly alluded to some of these processes in the first part of my argument, under the general term "habit." To run to the assistance of a little child in great imminent danger, to lift the arm and duck the head to protect the latter from an imminent blow, to smoke a pipe, or to drink whiskey,—all of these are, or may become, habitual or instinctive actions. And there is a little more to be said on this subject of habit, to completely fit it in with the theory of will-force.

The attempt is constantly being made by more or less philosophic scientists with more or less of a bias towards the mechanical theory, to explain all animal action as habitual, and therefore mechanical,—instance Professor Huxley's famous experiment with the frog. I have shown that there are obstinate facts which entirely upset the mechanical theory as a complete explanation of animal actions. Yet I have not denied the existence of many actions which are entirely habitual, and which, as such, are very largely, if not entirely explicable from purely mechanical data. I merely said that notwithstanding the existence of these habitual actions in the body, there are undoubtedly a great number of other actions which cannot be explained in this way. But the fact of habitual action still remains, and the relation of such actions to the will-force has yet to be described—they must be given their position in the theory. It is not sufficient merely to

ignore them. If such a large part of our daily work can be done by habit, then why not all? Or, if consciousness has a part to play in some actions, then why not in all? Why should *both* methods be required in the animal body, the habitual and the voluntary? Then besides habitual actions there are reflex activities. These certainly appear to be entirely mechanical. In habitual actions consciousness is not wholly absent. It appears to look on without interfering, but keeping ready to interfere at any time if necessary. In reflex action consciousness is wholly absent. Yet it is interesting to observe that consciousness *can* interfere if it chooses in some of the most important reflex actions of the body and in some persons more than in others.

The theory that connects consciousness with habit and reflex action is really pretty well known. But its importance is not apparent until the role played by consciousness comes to be recognized. A brief recapitulation of what is well known, is all that I need give here.

It is a matter of common observation that habitual actions grow out of actions performed by conscious effort. In learning to play a difficult musical instrument, such as the piano or violin, the closest and most persistent mental application and intent concentration of purpose are necessary to the beginner. But as the particular portion of the brain concerned, and the nerves and muscles all get educated up to their work, the process becomes easier and easier—the amount of conscious application becomes less and less—the physiological activities become more and more mechanical, and consciousness comes more and more to the position of a critical spectator looking on and ready to interfere at a moment's notice if anything goes wrong in the machinery. At last, in well-learned compositions, the performer will be able to talk of other subjects, and

play at the same time—but should he make a mistake, he will notice it at once and correct it.

Instinct is but habit intensified by ages of heredity. Yet, in the instincts of animals we see evidence that the connection with consciousness is still kept up, in the way individual animals sometimes introduce slight variations into their instinctive actions of their own will—generally to adapt themselves to some peculiarity in their surroundings—sometimes apparently out of pure whim.

Reasoning by analogy it is not inconceivable that reflex action may have grown out of habitual action by becoming fixed and intensified through a long process of mechanical repetition, both in the individual, and—through heredity—in the species, without any occasion for interference from consciousness. Yet at this day we do find that the action of the bowels, and the lungs, and—in some people—the heart also can be controlled by the will.

In the formation of habits we see the conscious principle at work building up its own body—constructing its own machinery for the carrying out of its own desires and plans. And it proceeds on exactly the same lines as the mechanical inventor, whose aim is ever to get more and more work done mechanically, so as to save labor—so as to save the trouble of conscious interference, and thus to set the conscious agent free, for general direction and supervision, and for other work.

* * *

It will be fitting here to conclude with a brief statement of two main results of the theory of will-force.

1. If force originates in consciousness, then, is not consciousness, as an origin, itself elementary? The argument that force is inherent in matter does not hold good here. We are confronted with an exception from which there is no escape. All force that is bound up in matter

is found to act in an invariable manner according to certain fixed laws, which are such that given certain preliminary measurements of the forces and masses concerned, the direction and strength of the succeeding movements in the system can be precisely foretold. But in the case of consciously directed motion, we have a force whose direction depends solely upon consciousness and is essentially absolutely independent of the direction and strength of any previously operating forces. It is the inherent nature of this force that in direction it is quite independent of any previous material or dynamic factors. It originates solely in consciousness. It is originally something quite apart from matter. It afterwards enters into matter; and, once there, there it stays for ever—merely moving from matter to matter. But it it did not begin in matter. It began in consciousness solely. What is this but to say that consciousness is a distinct element in the cosmos equally with matter?

There is some difficulty in conceiving of the origin of force in consciousness, just as there is difficulty in conceiving of its origin in matter; because, just as matter and force are abstractions of different orders, so are consciousness and force. Consciousness essentially—ontologically—is simply awareness. Force is quite a different concept. But, if the validity of the foregoing arguments is accepted, then this difficulty must be accepted likewise. The statement of the case on the lines of the spiritualist hypothesis is this: Spirit is a trinity of three attributes, (1) knowledge, or consciousness, or awareness, (2) will, (3) emotion. In terms of this conception, then, we should say, not that consciousness originates motion in matter, but that spirit originates motion in matter. As force exists in matter and yet is not matter; so it exists in spirit and yet is not spirit. These different ontological entities that make up the universe, are bound together in a certain order.

They have certain fixed relations one to another. That is all we are able at present to say. Time, space, matter, spirit, force, and in spirit we have three bound together in certain fixed relations of their own, viz., knowledge, will, and emotion. In this system of philosophy, it would be as well to restrict the term energy to that form of force which it assumes when united with matter.

We have no means at present of reducing the number of these elements. And we must not allow too strong an *a priori* bias in favor of simplification, and an absolutely unitary conception of the universe, to betray us into enforcing simplification, where the facts of experience and the legitimate inferences of pure reason are against it. After all, where there is order, there there is monism, there there is harmony. The very existence of order implies the existence of differing elements; and the eager attempt to reduce everything to one is an extreme tendency of certain minds unwarranted by facts. It is the false philosophy stigmatized by the editor of *The Monist*. under the name—Henism.*

The theory of will-force makes a difference to the whole process of evolution.

Evolution is now no longer a purely physical process, an affair of matter and energy. In the animal kingdom, in every organism undergoing evolution, the conscious entity is at work. The change in the structure of the organism is not due solely to the action of its environment. It is assisted, sometimes at any rate, by the effort of the conscious entity in the organism, to operate on its own environment, or on its own body, for its own purposes. The swiftest deer escape the tiger, and give birth to other deer that inherit their swiftness, while the slower ones are devoured. And so the deer tribe become swift of foot.

* I am aware that Dr. Paul Carus would be equally opposed to my notion of an Ordered Pluralism.

But it is evident how greatly this result must be helped on by the conscious effort of the deer to run as fast as he can. He uses his muscles to the very best advantage, and by use develops them. Thus the conscious entity in the deer, to some extent, builds its own body. And this reminds one, by the way, of the great stress that Professor Sandow lays on the putting of the will into the working of the particular muscle to be developed — the concentration of thought on that muscle. The deer cannot do this, because he has no knowledge of anatomy. But he works on the same principle as far as he is able.*

It seems likely that evolution proceeding on these lines will not require the enormous periods of time otherwise necessary to produce its results. A second, and totally distinct force, has been introduced as a factor in the process.

Evolution under guidance, is the theory invented as a compromise between religion and science. We see now how the guidance is introduced. It is introduced in the conscious efforts of the organisms undergoing evolution. The spiritual force in each, it is only reasonable to suppose, is derived from an infinite source pervading the whole universe. But it is in the conscious effort of the individual organism that we discover its working.

From this we may, cautiously, advance another step. If individual will-force is derived from an infinite universal source, then, reasoning by analogy, it is natural to infer that the universal will-force is employed in the grand affairs of the universe in the same manner as individual will-force is employed in the smaller affairs of animals and men—that universal evolution also is under guidance. Thus, from the individual will, we advance to the idea of God. This is not strict argument. But it is a reasonable

*This psychical process of body-building appears in its physical aspect as development by use.

hypothesis which serves the purpose of providing a place in universal philosophy for the proved truth of individual will-force.

There is, perhaps, a rather stricter argument which leads to the same conclusion. If some material energy originates in will-force, then it is a legitimate inference that all material energy has this origin. It would be a superfluous unnecessary assumption to suppose that we had two distinct kinds of material energy in the world, one derived from will-force, and one without any origin outside of itself. Once will-force is transformed into material energy, there is essentially nothing to differentiate it from other material energy—it has become the same thing. So it is obvious that we have but one kind of material energy in the universe. Then, as we find that there are provable instances of the origination of that material energy in will-force, and as this material energy is all of one kind, therefore it is an inevitable inference that all material energy has this origin. Therefore the whole universe must be pervaded by will-force. This universal will-force is one aspect of God, Brahma, the Universal Spirit.

This is not to say that the process of transformation from will-force to energy ever had a beginning in time. To argue , that as all material energy has had an origin in will-force, therefore there must have been a time when there was no material energy—when all energy was spiritual—would be unwarranted. *Because,* the amount of material energy in the universe may be infinite. It seems natural to suppose that it is. And if so, then the process has been going on forever.

W. E. Ayton Wilkinson.

Burma, India.

ARE MENTAL PROCESSES IN SPACE?

EVENTS or processes may be divided into those that exist and those that do not. Existent processes are those that occur somewhere, non-existent are those that occur nowhere. The existent is in short that to which the Aristotelian category *που* has a positive application. To the truth of this view most modern philosophers admit a curious exception. Feeling and thinking, they tell us, actually occur, but they are unique among real occurrences in that they occur nowhere. Space is filled with the physical, with matter and motion, and no room can be found in it for the psychical, which, as such, is certainly neither matter nor motion. Now, when a philosophical theory is greatly at variance with common sense, it is always worth while to re-examine the evidence upon which it rests. My purpose in this paper is to undertake that re-examination, and I hope to show as a result, that there is room in space for the psychical as well as for the physical, and that the prevailing notion that feelings can both exist and exist nowhere is not only paradoxical but false.

The reasons which influence the ordinary man to locate consciousness inside the body of the one who is conscious, are both direct and inferential—direct in his own case, indirect in the case of others. Each one naturally regards his thoughts and feelings and volitions as taking place in his mind, and he locates his mind in his body. It can not be denied, however, that things often appear to be where they are not, so we may pass over this introspective evi-

dence for locating our own minds in our bodies, and proceed to the second or indirect argument for the belief that the minds of other persons are within their bodies.

This argument is very simple. There are in the world a number of phenomena the loci of which we cannot directly perceive. We assign these phenomena their locations in accordance with a rule to which, so far as I am aware, no exception has ever been found. The rule is this: Every invisible thing is in the same place as the visible thing which varies directly and immédiately with it. Electricity, though in itself invisible, is located in the battery and wires on which it is found to depend. Gravitative attraction between masses is located in the masses and in the space between them, because it varies immediately with the masses and with the space between them. Now we locate the invisible mental processes of other persons in their visible bodies because, while thinking and feeling vary indirectly with many things, notably the external objects thought about and felt, they vary directly and immediately with only one system of objects—viz., the central nervous system of their owner. So when the plain man shocks us by saying that his mental processes go on "inside his head," let us remember that he is only applying to one series of events a rule which has always proved valid for the location of every other series of events.

Turning now to the arguments urged by the philosopher against this position, we find what seem to be three distinct lines of attack which for convenience we shall call the transcendental, the introspective and the empirical.

The first or transcendental argument aims to demonstrate the non-spatiality of the psychical as a direct consequence of the doctrine of transcendental idealism. Space, we are told, is an appearance; consciousness is an absolute and eternal reality. We could not locate consciousness in space without subordinating reality to one of its appear-

ances. To this we may answer that no one desires to locate the transcendental consciousness in space and still less in his brain. That eternal ego, in which the idealist believes, can remain the support or condition not only of space but of time. Our concern is wholly with the empirical consciousness, or with those cognitive, conative and affective processes which are admitted by everybody to be in time and to depend upon the brain. No disrespect is done to the eternal consciousness by locating the empirical consciousness in time; and as space is for the transcendentalist no worse an appearance than time, he cannot plead that the location of mental processes in space is incompatible with the general doctrine of transcendental idealism.

But, secondly, it is objected that introspection affords us an immediate intuition of the spacelessness of our mental states. For, it is said, if our sensations exist in space they will appear either as punctiform or as definitely extended and separated from one another by a definite number of feet or inches. Now we intuit our sensations neither as punctiform nor as figured, therefore they exist nowhere. This familiar argument seems plausible enough, until we notice the absurdity of the major premise. The dilemma it presents to us as based upon experience is in flat violation of all experience except the visual and tactual. I do not feel a pain in my foot either as punctiform or as square or as distant so many inches from a pressure in the same spot. Yet I none the less locate it in a certain part of space, namely, in my foot. The odor of a flower, the sound of a bell, the soft stickiness of molasses, are all definitely located in space, so far as immediate experience goes, but a question as to whether they were felt as square or triangular or punctiform would be regarded as foolish. It is only with color, and to a less extent with solidity, that spatiality and figure are indissolubly associated. And as for the mentioned non-spatiality of the *relations between* mental

processes, experience offers countless instances of relations equally non-spatial but which subsist between things about whose existence in space there is no question. Such, for example, are the relations of likeness and difference, harmony and dissonance, etc.

The third argument against locating mental processes in space has been in use since the time of Leibnitz. It is based on the actual or possible testimony of our external senses. The argument runs thus. When we look at the brain of a conscious being, we fail entirely to see the thoughts and feelings of that being. We find only the matter of which the brain is composed. Nor can we feel that this failure is due to the defects of our eyesight. For if we imagine ourselves to possess microscopes so transcendently powerful as to reveal the very atoms themselves, we believe with the utmost confidence that these atoms and their motions would be all that there would be to see. We can in no wise fancy how a sensation would look wedged in between two molecules. We reject such a possibility on much the same grounds that we reject the possibility of a round square. It is the essence of the psychical to be private in the sense of being inaccessible to external perception. The physically visible object is, on the other hand, a public or externally perceptible event. Visible space is filled with the physical, and there is no room in it for the psychical events, which are consequently non-spatial.

It must be confessed that this argument usually carries conviction, and it is certainly far stronger than either the appeal to transcendental idealism or the proof from introspection. Put in the form of a syllogism, the argument reads as follows:

(1) Whatever is from its very nature incapable of being an object for vision or for any of the external senses is not in space. (2) Consciousness is from its very nature

essentially private or incapable of being perceived externally. (3) Therefore consciousness is not in space. Granting the formal validity of this syllogism and the truth of the minor premise, let us question the truth of the major premise. Could we not conceive of something located in space, and yet incapable of being perceived by an external observer? Objects, in order to be perceived by us, must impress our sense organs with some form of kinetic energy. Kinetic energy is a public fact, externally accessible to many observers, but potential energy, which is admitted to be in space, can only be externally perceived by passing into a kinetic state, that is, by ceasing to be itself. To feel it as it is, we must participate in it. To perceive a stress, our muscles must undergo stress, just as to perceive a pain or pleasure, we must be pained or pleased. In short, the peculiar inaccessibility of mental processes to all modes of external perception is shared by potential energy, and is consequently no evidence of spacelessness.[1]

At this point, however, a vigorous objection may be made to the way in which we are using the concept potential energy. Potential energy, so we shall be told, means one of two things, either of which would vitiate any analogy between it and the psychical. According to some, potential energy is nothing actual at all, but simply the possibility of motion. An elastic ball collides with a fixed object, loses its motion in one direction, and then resumes the same

[1] The second and third arguments in favor of the spacelessness of consciousness are more closely related than may at first appear. They each assume that a thing, in order to fill space, must fill it *extensively*, as matter fills it, and must consequently be (1) figured, and (2) externally perceptible, neither of which attributes can be ascribed to consciousness. Both arguments neglect the possibility that consciousness may occupy space *intensively*, as the force of gravity between two planets or the stress in a watch-spring, and hence be neither figured nor perceptible through the external senses. For example, if any one were to demand that an acceleration either be proved to have a definite figure and to be visible through a microscope alongside of the particles of the accelerated body, or else be treated as not in space at all, we should unhesitatingly regard the proposed dilemma as absurd, in that it assumed that the intensive occupancy of space by a force was the same as the extensive occupancy of space by a body.

amount of motion in the opposite direction. As the ball cannot move back until it has ceased to move forward, it must inevitably pass through a moment in which there is no motion at all. At this moment all the kinetic energy has been transformed into potential energy. If we define this potential energy as a bare possibility of future motion and as nothing in itself actual and present, we shall have to admit that motion can pass into nothing and can come from nothing, and that this happens whenever and wherever the direction of a motion is changed, and that the nonentities into which motions pass possess the miraculous power of recreating quantities of motion exactly equal to those that were annihilated. I think it will be admitted that such beliefs constitute a pretty severe strain on even the most radically empirical of imaginations; and, as a matter of fact, the second conception of potential energy is the more defensible. According to this conception potential energy is only kinetic energy on a scale too small to be visible to the senses. The motion of the elastic body as a whole is, upon impact with another body, converted into some kind of imperceptible motion of its parts, and these minute motions which make up what we call potential energy, are in turn re-converted into visible motion of the body as a whole. The difficulty with this conception, however, is at once manifest when we try to imagine how these invisible particles are to lose *their* motion in one direction and regain it in an opposite direction without passing through a phase in which there is no velocity in either direction, but only acceleration or stress—the actual reality into which past motion has been converted and from which future motion will arise.

And now that we have seen that potential energy and consciousness resemble each other in what is for each the distinguishing point of inaccessibility or intransmissibility, a hypothesis suggests itself that they are identical, that

what we know directly from within as the psychical or subjective side of experience may be the same as what we know indirectly from without as the potential energy of the nerve currents in the brain. A line of thought somewhat similar to this was suggested by Kant in his treatment of intensity and of the dynamic theory of matter. It was more than suggested by Herbart. Lotze somewhere speaks of the possibility of describing the action of body on mind as the passing over of energy into intensive states of the real. Karl Pearson says, in his *Grammar of Science*, that stored sense-impresses may be modes of brain strain. Ostwald feels that energy is the most hopeful concept for uniting the physical and psychical. In fact, ever since the time of Leibnitz, there has existed an undercurrent of thought along this line.

Let us consider for a moment some of the advantages that would result from conceiving psychical processes as modes of potential energy. Most of us have probably felt at one time or another a pang of regret that the conventional statement of materialism was so easily refuted. It would be such a simplification of the psychophysical problem if consciousness were a mode of motion. The theory wants nothing but truth. Unfortunately we know motion and we know consciousness, and they are obviously different both in themselves and in their manner of behavior. We cannot, however, so easily dismiss the proposition that consciousness is a mode of potential energy. It may be said that the experience of stress or strain is not any more like the psychical in general than is the experience of motion. We must remember, however, that as velocity can be transformed into energy of acceleration, so acceleration can pass into the second derivative of the velocity. *The modes of potential energy into which nerve currents and other motions can pass include in addition to acceleration, the whole endless series of higher derivatives of space with*

regard to time, and in these purely intensive magnitudes and their mutual relations and combinations we have a system which is sufficiently rich and complex to express the manifoldness and multidimensionality of psychic life.

We know that the intensity of a sensation is, according to the law of relativity, determined not merely by the energy of the nerve current induced by the physical stimulus, but by the relation of that current to other currents already present in the brain. So the intensity of a mode of potential energy is similarly determined by the degree of opposition of one mode of kinetic energy to another. We know that the general intensity of consciousness is proportional to the tension, redirection and readjustment that is necessary. The reactions that are smooth tend to become habitual and unconscious. But the degree of redirection which a nerve-current undergoes at a given nerve center, varies concomitantly with the intensity of the phase of potential energy through which it passes at that center; for, as we have seen, motion in one direction must be transformed into the potential energy of stress before it can reissue as motion in an opposite direction. Finally, we may note that the protoplasmic structure with which consciousness is associated is noted among all other material structures for its power to store up and accumulate potential energy from the streams of kinetic energy that are fed to it by its environment.

Many more analogies like the above might be adduced as direct evidence for the truth of the hypothesis that psychical processes exist in space as modes of potential energy of the nervous system. In closing, however, I wish to mention by way of indirect evidence the bearing of this hypothesis upon the dispute between parallelism and interactionism.

Both parallelist and interactionist assume that the mind is not in space. The interactionist declares that he will

trust the evidence of experience and common sense to justify his belief in causal interaction between mind and body. The parallelist, on his side, declares that he will trust his scientific instinct to justify him in rejecting any causal relation between a body that is in space and a mind that is out of it. Is it not clear that if consciousness could be identified with the intensive or potential energy which is actually present though invisible in the brain, the two sides would cease to dispute, and each could claim to have been right? There would be no impossible interaction of a spatial body and a non-spatial mind, and yet a nerve current would really cause a sensation as truly and in the same manner as motion in a body causes stress in the body with which it collides; and a psychical volition would really cause a physical action as truly and in the same manner as the tension in a bow causes the flight of an arrow. In every case of sensation nature would perform an operation of differentiation, transforming energy from the kinetic phase of MV^2 into the potential phase of MAS. Similarly, in every case of intelligent volition, nature would integrate the differential equations of a psychosis, transforming the energy of acceleration and the higher derivatives back into the visible and physical energy of motion.

In short, the existence of mental processes in space would seem to be equally a postulate of common sense and a desideratum of psychophysical method.

WM. PEPPERRELL MONTAGUE.
COLUMBIA UNIVERSITY.

A MONISTIC CONCEPTION OF CONSCIOUSNESS

IN REPLY TO MR. AYTON WILKINSON'S ARTICLE ON "WILL-FORCE" AND MR. MONTAGUE'S "ARE MENTAL PROCESSES IN SPACE?"

ALL religious and philosophical problems are centered in the soul-conception, for the nature of the world and our attitude toward it, our conduct and ethical principles, the significance of life, and any other issue of practical consequence, will depend upon the nature of our own being. So it is quite natural that men of a serious temper are much concerned about psychological problems, because they feel that a wrong psychology will warp their philosophical system and twist their ethics so as to render it an unsafe guide through life. On the other hand, however, we find that men who start from wrong principles correct their mistakes through practical motives. They grope in the dark and though they make a wrong start, finally reach the right conclusions because their conscience is properly attuned to the universe and they are therefore able to adjust themselves properly and find their true bearings.

We published an article by Mr. Wilkinson in *The Monist* of January, 1899, but he insists that in an editorial reply at that time, his presentations were completely misunderstood. We must leave the decision of this question to our readers, but if we were mistaken, we will now make up for our error by giving him another opportunity to ex-

plain his views, and we do this the more gladly since his essay touches the salient point of the question.

We do not share his views, but we have tried and abandoned them, and believe that no thinker should pass them by without considering them both earnestly and thoroughly. Though we can not accept Mr. Wilkinson's view of the soul, including also his theology and philosophy, we grant that his arguments are well taken, as well as any man of science who would agree with him could present them.

The question of the soul and its nature is the basic problem of our world-conception, and attempts have constantly been made to give to the soul an exceptional position in the universe, to let it be a force, or a power, or an entity, possessed of sundry mysterious faculties which are capable of mechanically interfering with natural things, without itself being at the same time mechanical or purely physical. Mr. Wilkinson pursues this same object but no longer relying on metaphysical considerations, as do his predecessors, he modernizes the issue and would make his interpretation of the soul plausible to a man of science.

There are two philosophical world-conceptions, which are diametrically opposed to each other, and we will call one the materialistic, and the other the spiritualistic view. The former attempts to establish monism, the latter openly declares that monism breaks down and we have to accept either a dualism or a pluralism. The former view, that of materialistic monism, proposes to explain the origin of the soul from the rest of the universe, which represents itself to our senses as matter in motion. The latter view, that of spiritualistic dualism or pluralism, recognizes the soul as a mysterious entity, and the question is only whether we have a contrast of two things (spirit and matter) implying dualism, or whether our soul is an irre-

ducible unit in itself. The latter view inevitably leads to pluralism.

If materialistic monism is correct, it is commonly claimed that consciousness is merely a manifestation of matter; that all actions are determined by the irrefragable law of necessity, and that consequently man is not responsible for his deeds. Accordingly freedom of the will would be an illusion, and ethics a vagary. There would be no law that any one would have to respect and the survival of the fittest would be the only norm of human conduct. It is obvious that science possesses a monistic trend, and wherever we enter into details of physics, physiology, chemistry,—even into zoology and anthropology, including psychology, the monistic conception is verified and has led to the assertion that modern psychology is a psychology without a soul.

In contrast to this materialistic monism, a large class of thoughtful men have embraced the opposite horn of the dilemma, and believe in the existence of a separate soul-entity. They accept scientific statements as limited to certain spheres of existence, but believe that the soul, or generally speaking the spiritual factor of life, constitutes an exception to the rule of universal causation; and thus they force upon us the theory of dualism or perhaps pluralism. The main problem to men of this class consists in reconciling the strict methods of science, which after all are unequivocally monistic, to their dualistic or pluralistic views. This being impossible, their philosophy will either be mysticism, agnosticism or pragmatism.

Mr. Wilkinson's explanation is especially fascinating because it is unusually tinged with a recognition of the monistic principle of science, and at the same time is in accord with a dualistic theology which re-establishes the conception of a God as creator without denying the principles of science; and yet we must object to Mr. Wilkin-

son's argument because a truly consistent monistic view is after all superior, and avoids the contradiction of dualism in which the logical inferences of his views become implicated.

We wish to state from the start, however, that our monism is different from the common monistic conception which we have characterized as materialistic monism. In so far as we recognize many points on which the main arguments of dualism are based, we take a middle ground between the two views, and we would emphasize the fact that we are far from denying the significance of the soul. We accept the truth that the soul is the master of the destiny of man. It is the principle of direction, and moral responsibility exists as a fact to be accounted for, not to be doubted or explained away. Materialistic monism which practically denies the soul is one-sided, and we have so far characterized it as a pseudo-monism which might be called henism, since it is a theory of unification which, instead of presenting an impartial view of the whole universe, artificially reduces contrasts by denying either opposite, and thus lacks completeness because in contemplating one side it ignores the other.

Consciousness is a fact which no one can deny, and it is the most wonderful fact within the range of our experience. It is not less wonderful for the reason that it is really the fabric of which the soul is woven, but the peculiarity of consciousness is that it is not a material thing, not a substance, not even a permanent existence, nor an entity of any kind, but a function. It is fleeting; it originates and disappears; it varies; it grows stronger and weaker; in sleep it is reduced; and in death becomes to all appearance entirely extinct. Its contents, too, change constantly, and there is scarcely an instant in our lives in which we have the same thought repeated. Consciousness is closely interwoven with the sense-impressions of touch,

motor sensibility, taste, smell, and especially sight; and our soul weaves out of these sense-impressions, a higher world of abstract thought most of which is more or less accompanied by sentiment, i. e., an emotional element partly pleasurable, partly painful, partly indifferent.

Consciousness is a phenomenon radically different from the world of material objects as which our sense-impressions represent our surroundings including even our own body. It can be characterized as awareness; for consciousness is that state which makes us know of our own existence, and, as simple as this seems to be, we repeat it is the most wonderful fact within the range of our entire experience and stands in contrast to the general features of the objective world in which we move.

Consciousness is a complicated state and the elements into which we can analyze it are called feelings. Feelings in their turn are not ultimate units, but consist of subconscious states of irritation and these again depend upon highly complex conditions in the organization of living substance. Then we lose our track in the realm of the unconscious.

We must recognize that our experience shows us a contrast of two states of things. In the first place, the world as it confronts our senses; its general features are matter and motion, and those portions of it which in the general flux show a certain stability we call objects. Secondly, the world of which we feel our own awareness, consisting of sensations, sentiments, thoughts and volitions. The former is the world of objectivity and the latter is called subjective.

If the domains of objectivity and subjectivity were two isolated spheres, dualism would have to be regarded as incontrovertible, but subjectivity and objectivity are so interlinked that there is no subjective state which does not imply an objective reality of some kind. Hand touches hand, and what seems to us subjective feeling is at once repre-

sented by our senses as an objective condition in our limbs, and so we come to the conclusion that our corporeal being is part and parcel of the objective world which we represent to lie outside of ourselves. We can not doubt that our body constitutes a part of the entire cosmos; we grow from it, we are nourished by it, and after the dissolution of death the constituents of the body return to it. At the same time we notice that our states of consciousness are dependent upon the influences of objective existence, yea the subjectivity of our consciousness can only be explained as due to the organization which has naturally arisen in the course of the evolution of life. We are compelled to view the contrasts of subjectivity and objectivity under a monistic system which conceives them as two sides or phases of the same reality; subjectivity is the inner state, as existence is in itself; while objectivity is the external or outer aspect, as anything that exists presents itself to other things. In itself everything that exists is a subjective state of selfness, which may be unconscious, subconscious, or conscious, but if approached from the outside it is an object, i. e., a material body in motion.

Having in previous publications, especially in *The Soul of Man* and in *Whence and Whither*, explained with sufficient attention to detail, how subjectivity, which in its elements is potential feeling, develops by organization into consciousness; and how irritability changes into mind in the measure that feelings acquire representative value, we can limit ourselves here to the issues raised by Mr. Wilkinson who looks upon consciousness as possessed of the intrinsic power to create energy from nothing out of its own mysterious resources. Mr. Wilkinson bases his contention upon the fact that consciousness imparts direction to our movements, and we do not deny its directive faculty. It might seem then that since consciousness possesses no energy it must be capable of generating it, and that is indeed

Mr. Wilkinson's conclusion. He is fully aware of the scientific difficulty of assuming that something should be produced from nothing, but he finds much satisfaction in the thought of rehabilitating in this way the conception of a personal and a conscious God who has created the world from nothing, merely by the force of his will.

We grant that mind is a directing faculty, and we also know that consciousness is commonly and rightly held to be void of motor power. But these two concessions might seem contradictory and need some explanation.

We must consider that all our ideas are abstractions. When we speak of consciousness we mean consciousness and not motion. Accordingly we understand that consciousness does not move, and that motion does not become consciousness. When we speak of matter we mean all those features which are common to the objects of our senses. There is no material which would be matter and nothing but matter, or in other words the idea of matter in itself is a fiction, and so is the idea of consciousness in itself. So far as we know, consciousness is closely linked with motion of some kind and every thought which we think must be the internal state of a physiological commotion in the nervous substance of our brain. Accordingly the actual process of the function of consciousness presupposes an analogous objective process of cerebral activity, which is a mechanical process of a definite discharge of energy. There is no consciousness by itself alone. We make this explicit statement because the lack of its cognisance has produced infinite confusion among psychologists and philosophers from time immemorial.

The ancient philosophers of India represented the soul as a blind man possessed with muscular motor power carrying a lame man in possession of his full eye-sight. The seeing man could give directions to the man who carried him but he could not walk himself, and the blind man could

walk but could not find his bearings. This simile is based upon the assumption that abstract ideas exist by themselves. Consciousness is supposed to be the lame man who can see, and our motor power with all the energy of our feet and hands including the energy stored in our brain is compared to the blind man who can move about but who is unable to see. Philosophers even of modern times have taken the simile literally and seriously by insisting that consciousness is a mere spectator; for it can not move, and our motor powers comprising all the energy at our disposal can not become conscious. This is true if we understand by consciousness the abstract idea of consciousness or consciousness in itself, and by energy all our motor power to the exclusion of any thing else. But it is not exactly true if we consider the actualities from which these two abstract ideas have been formed; for we must grant that they are merely two aspects and not isolated domains in the life of man.

Consciousness or the state of awareness is an internal and subjective process. Leibnitz says somewhere that if we could see the interior of our brain we would be able to observe particles jostling each other, but no feelings, no consciousness, but for all that an omniscient guide through the labyrinth of the nervous system could point out to us those commotions that are accompanied with consciousness. If consciousness (the purely subjective state) can not move, we are sure that these tiny brain motions (being the objective actualities of consciousness) produce modifications in the tissues which make muscles contract. The energy may be insignificant in amount but it acts in a place where, like the rudder in a ship, it possesses extraordinary efficiency.

Mr. Wilkinson assumes that will-force generates energy and hints at the possibility that all energy may be the product of such will-force, which proposition if tenable,

would give a new lease of life to the old and scientifically discredited idea of a creation of the world from nothing by the fiat of a spiritual being called God. According to the monistic view organisms receive their energy from the storehouse of nature and return it by using it. All that has been supplied they surrender again in the form of motion and heat, and in this metabolism, this constant flux of matter in motion, consciousness is sustained not unlike the light of the flame in a lamp. In fact this metabolism constitutes the essential feature of organized life. Awareness renders us conscious of our own state of being and in this way it influences living creatures.

When we speak of consciousness we mean the subjective state of our physical condition and not the physiological process of the brain, and so we must insist that awareness in itself is no motion, but no one denies that the objective process in which it makes its appearance is as much a motion as are all other physiological occurrences; but the motory portion of brain work is insignificant in amount and its mechanical feature is not its aim or end.

Though consciousness, in itself, is not energy, the fact of consciousness is obviously the most significant event in the development of life. A strong unpleasant awareness of certain conditions is called pain. If pain were unconscious, living creatures would not mind it; and, *vice versa*, if pleasure were unconscious, living creatures would not attempt a pursuit of pleasure. Pain, the awareness of untoward states, and pleasure, the awareness of pleasing conditions, are the main factors that give direction to the motor apparatus of living beings, and if they were unconscious, the ends pursued would be different.

If a frog is placed in water and the water is slowly and gradually heated so as to render him unconscious of the pain of the increased heat (for it takes a definite amount of change to make a modification of conditions pass the

threshold of apperception), the frog would allow himself to be cooked alive while a jump out of the pan could easily save him. If, however, the increase of heat is quick and intense, he flees from the place perhaps not on account of the danger but because he feels uncomfortable.

The tension of the subjective state which passes into action is called volition, and the accomplishment of a motion, an act of the will. Neither in volition nor in will is there any procreation of new energy, but simply an imparting of direction to energy held ready for the purpose.

When we speak of direction we mean a line of motion the position of which in space and its relation to a given line of reference are determinable by the measurement of angles. Direction in itself is not motion, but the imparting of direction, of course, is a motion. Here the case is analogous to consciousness. The position of the ship's rudder is a state or conditon, but to adjust the rudder according to requirements takes a certain, albeit a comparatively small, amount of energy.

Mr. Wilkinson speaks of the law of the conservation of matter and energy as a new-fangled doctrine, but he forgets that it is merely a new formulation of a very ancient and universally recognized law, the law of causation. The law of causation is a positive statement of the same truth proclaimed by the law of the conservation of matter and energy, which is simply a negative and therefore more cautious statement declaring that nothing can originate through or from nothing. Every new creation is merely a new combination of realities that existed before. In other words, the sum total of energy and matter remains the same, nothing (in either substance or force) can be lost, nothing in amuont can be added except it be taken from somewhere. Everything that is positively new is due to form.

It will be instructive to compare Mr. Wilkinson's view

of the soul with Professor Ostwald's psychology of energetics as presented by him in the last number of *The Monist*. Professor Ostwald, too, thinks that there is some peculiar and special soul energy, but he would not countenance the idea of abolishing the law of the conservation of energy. He is antimaterialistic, but for all that he does not understand the point made by Leibnitz, viz., that consciousness is a purely subjective process, not a motion, nor anything material or objective. Ostwald is a monist, or at least tries to be one, but his monism consists in an omni-energeticism. Everything is energy, even the soul.

Professor Ostwald's line of argument is taken up by Professor Montague in an article published in the present issue of *The Monist*. He presents insurmountable difficulties which upset not only the interactionist theory but also the current psychology of parallelism, but his arguments presuppose the assumption of an independent existence of consciousness, and nowhere does he take into consideration the well established parallelism as commonly held by Herbart, Weber, Fechner, Wundt, Helmholtz, Hering, Ribot and others. None of them would deny that mental processes are in time, that they take place in succession, and also that their physiological activity is definitely localized in the brain. This view by no means excludes that consciousness itself, irrespective of its physiological substratum, is a purely subjective state, a mere condition of our awareness which as such has no motive power. The concatenation of physical processes in uninterrupted motion is always acting on energy, perhaps setting free stored-up energy, and nowhere is there a gap in the chain. Only some parts of the chain are such as to be possessed of peculiar states of awareness and though awareness is purely subjective, its presence is by no means indifferent. Concerning this latter point, however, I must grant that I am at variance with some supporters of the

theory of parallelism, who claim that the flashing up of consciousness has as little effect as sparks of the engine thrown out of the chimney have upon the machinery which it sets in motion. And in a certain way this is true, for a motion of the muscular system takes place only when the motor nerve is stimulated, which means when the chain of mechanical connection remains uninterrupted. It is true enough that any motion can be executed with or without consciousness, but I would insist that whenever in novel conditions deliberation is needed, the presence or absence of consciousness would not be indifferent as to the final outcome of a decision.

The physiological details upon which the condition of awareness depends are not sufficiently known, but we may be sure that it is due to a process of organized interaction so arranged as to make a concentrated set of feelings become extraordinarily vivid, either by contrast or by convergence. Professor Montague has never alluded to the psychology of parallelism as it is set forth for instance by Hering in his famous essay *On Memory*,* or as the author himself has treated the subject repeatedly in books and magazine articles.†

Professor Montague quotes a number of views for the purpose of refuting them, but he nowhere cites the authorities of his opponents, (a habit shared also by Professor Ostwald, in some philosophical discussions at least) and so we cannot help having the impression that he exercises on self-fabricated men of straw. If similar views have been actually propounded by some scholars we are sure that their propositions were in some not unimportant details somewhat different.

Professor Montague accepts Leibnitz's criticism of the mechanistic theory and grants that consciousness is not a

* Chicago: The Open Court Publishing Company.

† For instance the first chapter in *The Soul of Man*, "Feeling and Motion."

motion. The simplest solution that suggests itself to him is the assumption that it is potential energy. Motion (or kinetic energy) is visible, and if consciousness can not be seen, it might very well be that other kind of energy which being latent is not in evidence.

This is not a solution of the problem but a mere lack of appreciation of its significance. If consciousness is neither a material thing, nor a mechanical process, but an invisible subjective state, which could not be seen even if we could enter the brain where consciousness is being manufactured, it can not be a motion, but neither can it be a tension (i. e., a state of potential energy); and so Professor Montague's argument can only serve us as an instance that the philosophy of energetics breaks down in psychology.*

We will add that Professor Ostwald himself might have felt tempted to explain the soul as potential energy. We must confess that on reading his expositions on the subject we had the impression that he came dangerously near falling into the error, and it is not impossible that he was prevented from following this line of thought by his knowledge of physiological processes. He must have borne in mind that all states of feeling are accompanied by some nervous commotion and a state of rest in consciousness always coincides with a physiological state of rest. So long as nervous energy remains stored up in cerebral structures the *psyche* is at rest, and only the release of the stored-up energy, only a change of potential into kinetic energy, can indicate the condition of mental activity. It is obvious that mental activity means physiological work, not a passive condition of an uneventful storage.

* * *

Mr. Montague claims that some psychologists or philosophers propound the theory that mental phenomena

* Compare the editorial discussion of Ostwald's Energetics in the October number of *The Monist*, p. 516.

are not in time and space, and perhaps that is so. We will here not ask who they are and what they really mean, but prefer to investigate the problem itself and ask the question, In what sense can it be said that mental phenomena are not in time and space?

It seems to me that nobody ever doubted that the process of thinking is temporal, in other words, that ideas, arguments, conclusions, decisions, etc., are being thought in time. The process of thinking begins at a certain moment and the chain of thoughts is consecutive. One idea follows another, and when the conclusion is reached the argument has come to an end. Consistently with these facts we must also grant that the thinking takes place somewhere within the body of the thinking person. We may be unable to localize the specific place in the brain, but for all that there is no one that would place it either nowhere or somewhere outside of the thinker's corporeal personality.

Yet if we do not speak of the process of thinking and bear in mind only the ideas that are being thought, we may very well insist that the ideas themselves do not depend upon time and space. Moral ideals for instance, such as justice, truthfulness, manliness, wisdom, etc., are eternal norms; just as the theorems of geometry and arithmetic are true anywhere and everywhere, and remain the same whether or not individual thinkers discover them in their brains.

They are not material, not corporeal, not concrete, for their very nature is generality which implies that they are independent of time and space.

Considering the fact that all rational thinking consists in utilizing generalizations and attempting to actualize for our own benefit the eternal norms of thought, we must grant that all abstract thought contains an element that is above time and space. All higher thought soars into the realms of the eternal, the universal, the superspatial rela-

tions. Consciousness is subjective, and consciousness is closely interrelated with the physiological substratum of brain activity, but the purpose and aim of our thinking is a comprehension of concrete events, experiences, or things of any kind under the viewpoint of uniformities, the very nature of which is that they are independent of time and space. In this sense and in this sense alone thought may be said to be neither temporal nor spatial. It is the actualization of the purely formal, the intrinsically necessary relations of what Kant calls the *a priori*, and Plato the eternal types of being,—ideas.

Our monistic view is neither materialistic, nor is it energistic. Matter is mere mass, or material, and energy, like all horsepower, is measurable in foot-pounds; it is not a deity to be spelled with a capital E. The problems of life and the ideals of mankind are not to be sought in the domains of either matter or energy, but are, all of them without any exception, questions of form. Hence the paramount importance of form; and for this reason we may call our monism "the philosophy of form."

A materialistic monism loses sight of the significance of form and, with it, of all intellectual, moral, artistic and religious treasures. We do not blame those who bear in mind the spiritual needs of mankind for shrinking from a onesided monism which ignores the most important facts of life and would rather accept some dualistic or mystical or agnostic explanation of the world than surrender the best and the holiest possessions of the heart, which are the only things in the world that impart worth to life. For this reason we take an interest in Mr. Wilkinson's efforts to establish his theory of consciousness, but while we appreciate that he does so in order to account for certain facts which a materialistic monism either denies or leaves unexplained, we can not accept his theory because his arguments appear to us insufficient and indeed untenable. We

recognize in the pseudo-monistic system those very faults which he is anxious to avoid, and we establish the points he makes, viz., the significance of the soul as a principle of direction, and the possibility of man's responsibility including the importance of moral maxims.

Not the least advantage of our position, which is a new monism built upon a broad basis with special emphasis on the significance of form, consists in the fact that it renders possible a new interpretation of our religious traditions and thus it comes as a conciliation between science and religion; it comes not to destroy but to fulfil.

EDITOR.

THE ATTITUDE OF ORIGEN AND AUGUSTINE TOWARD MAGIC.

GROSS superstition among the masses and (to speak mildly) an unscientific attitude among the most highly educated were prominent features of the intellectual life of the great Roman world under the emperors. Indeed it is to be feared that these features had by no means been entirely absent from the palmiest days of Greek genius. Divination, vouched for by religion and politics, captivated science and philosophy as well. The learned Ptolemy wrote on the art of astrology, while Stoics and Neo-Platonists propounded ingenious theories in support of the various forms of foretelling the future and of the occult interaction of objects. Medicine was full of the use of charms, numbers and irrelevant ceremonial, and the other natural science which then was in existence was in like manner inclined to the fantastic. There was a widespread belief in the existence of countless demons with powers over the different parts of the material universe, demons whose services men might obtain by the use of proper words and formulæ. Finally there lurked in men's minds a conception of a mysterious form of practice or body of lore called "magic." To reduce this conception to definite terms is difficult. A few held magic to be of practical benefit and soul-inspiring; the vast majority would have it the source of crimes and the bane of mankind, but that was about as far as they went in the way of definition.

Pliny the Elder, whose *Historia Naturalis* affords the most comprehensive view of ancient science in the Roman world and who is our chief authority in that age concerning magic, regarded it as always reprehensible, yet declared that of all arts its influence had been greatest in every land and in almost every age; that it had embraced and combined into one the three other things which appealed most powerfully to the human mind,—religion, medicine and astrology,—a statement the truth of which his own unconscious confusion of superstition and science often corroborates. Thus to a certain extent he identified magic with the fantastic conceptions which infected the religion and science of his day, and made the term emblematic of an unscientific attitude, a precedent which we may have occasion to follow.

Into this Roman world entered a new force, a religion which was to overcome all other creeds in Europe. Divination formed no part of its doctrine or ceremonial; astrology it looked at askance as infringing on human free will, special providences and divine omnipotence. Consequently with the prevalence of this new religion was likely to come a change in the attitude of the Western world to such superstitions. This change may be seen to some extent in the pages of two prominent Christian writers, Origen (185-254 A. D.) and Augustine (354-430), especially in their well-known works, *The Reply to Celsus* and *The City of God*. Origen, writing in Greek at Alexandria, familiar with all the culture of his times and also with its past, by his urbane, broad-minded and erudite exposition of the Christian religion and its relation to life, did perhaps more than any other man to bring over educated and thinking pagans of that day to the new faith. The fact that some of his doctrines were later pronounced heretical lessened greatly in all probability his influence upon mediæval Christians, but Augustine's influence and power rather grew with time.

Thus the present survey will throw some light on the mediæval attitude toward magic and occult science.

Both Origen and Augustine, by the frequency with which they refer to the subject and by the way in which they speak of it, reveal the prominence of what they called "magic" in the life and thought of their times. The term seems to cover practices which are of every day occurrence and to represent concepts which are present before every mind. True, a chief reason for the discussion of magic by these Christian apologists is their wish to refute the imputation to Christianity by its opponents of the use of sorcery and incantations and to discriminate between miracle and magic, holy prophecy and divination. But this is not the sole reason for their references and moreover the very existence of such imputations and denials goes far toward demonstrating the prominence of magic in their day.

Both writers define magic in practically identical terms. Their definition is more precise than the vague references to which most pagan writers limit themselves and narrower than Pliny's description of magic which in a way associates the term with superstition and unscientific attitude in general. Their definition is especially noteworthy because it is the one which prevailed throughout the Middle Ages. Magic is, according to them, the outcome of man's illicit relations with demons whom he coaxes or coerces by spells and incantations. Origen speaks of "magic and sorcery whose wonders are worked by wicked spirits, held spellbound by elaborate incantations and yielding themselves to sorcerers."[1] Augustine explains that demons are enticed to work marvels not like animals by food but as spirits by symbols which conform to their individual tastes, various kinds of stones, plants, living creatures or cere-

[1] **Reply to Celsus, II, 51.** ....*μαγείαν καὶ γοητείαν, ἐνεργουμένην ὑπὸ πονηρῶν δαιμόνων, κατακηλήσεσι περιέργοις θελγομένων, καὶ ἀνθρώποις γόησιν ὑπακουόντων.*

monial utterances. "Whence arose the magic arts and their practitioners."[2]

Both writers accept the principle of sympathetic magic and of the power of symbols. Augustine, it is true, explains that the demons first instructed men as to what objects or signs would attract and repel them, but he does not deny that, these secrets once disclosed, the charms of the magician have efficacy. Origen, moreover, in one place expresses doubt whether demons can cure the body, whose different members Celsus, on the authority of the Egyptians, had declared subject to thirty-six demons, but elsewhere he speaks of the demons as having different regions of the earth assigned to them.[3]

But although Origen and Augustine believe in the existence of sorcery, they utterly disapprove of it and assert that Christians have nothing to do with it,—which

[2] City of God, XXI, 6. Addimus enim ad istam lucernam inexstinguibilem et humanarum et magicarum, id est per homines dæmonicarum artium et ipsorum per se ipsos dæmonum, multa miracula; quæ si negare voluerimus, eidem ipsi cui credimus sacrarum litterarum adversabimur veritati... Inliciuntur autem dæmones ad inhabitandum per creaturas quas non ipsi sed Deus condidit, delectabilius pro sua diversitate diversis, non ut animalia cibis, sed ut spiritus signis, quæ cuiusque delectationi congruunt, per varia genera lapidum herbarum lignorum animalium carminum rituum. Ut autem inliciantur ab hominibus, prius eos ipsi astutissima calliditate seducunt, vel inspirando eorum cordibus virus occultum vel etiam fallacibus amicitiis apparendo, eorumque paucos discipulos suos faciunt plurimorumque doctores. Neque enim potuit, nisi primum ipsis docentibus, disci quid quisque illorum adpetat, quid exhorreat, quo invitetur nomine, quo cogatur; unde magicæ artes earumque artifices exstiterunt.

[3] Reply to Celsus, V, 10. Possibly Origen believed that since the coming of Christ the demons had lost the power which they once possessed. In his discussion of the appearance of the star of Bethlehem to the three magi he explains that the magi, having dealings with demons, are able to bring wonders to pass until "some more divine and powerful thing than the demons or the incantations used to invoke them appears or is spoken." Then the efforts of the demons become unavailing since the spirits "are not able to face the light of the godhead."—Reply to Celsus, I, 60.... *μάγοι, δαίμοσιν ὁμιλοῦντες, καὶ τούτους ἐφ' ἃ μεμαθήκασι καὶ βούλονται καλοῦντες, ποιοῦσι μὲν τὸ τοιοῦτον, ὅσον οὐδὲν θειότερον καὶ ἰσχυρότερον τῶν δαιμόνων, καὶ τῆς καλοῦσης αὐτοὺς ἐπῳδῆς ἐπιφαίνεται ἢ λέγεται ἐὰν δὲ θειοτέρα τις ἐπιφάνεια γένηται, καθαιροῦνται οἱ τῶν δαιμόνων ἐνέργειαι μὴ δυνάμενα ἀντιβλέψαι τῷ τῆς θεότητος φωτί.*

is more, Origen adds, than can be said of pagan philosophers.[4] For our two writers regard the "demons" of the ancients as evil spirits, as devils. They feel that the functions and powers attributed to these spirits are inconsistent with the monotheistic faith which Christians profess, but as they do not possess the mental boldness to deny the demons' existence altogether, they represent them as enemies of Almighty God but as tolerated by him. Similarly magic is an evil which exists through man's depraved curiosity, the evil nature of the demons and God's unfathomable forbearance.

Augustine speaks several times of "the crimes of magicians."[5] Defending Christian miracles, he asserts that

" They were wrought by simple confidence and devout faith, not by incantations and formulæ composed through an art characterized by depraved curiosity, which people call either magic or by the more abominable name, sorcery (*goetia*), or the honorable title of theurgy, endeavoring as it were to distinguish different varieties and wishing to make it out that some men are devoted to illicit and condemned practices—who are properly termed wizards, for these they say practice sorcery—while others, to whom they assign theurgy, are to be considered praiseworthy. But both classes are alike entangled in the deceptive ceremonies of demons who masquerade under the names of angels."[6]

Augustine is for a moment somewhat shaken in this stand against theurgy by the authority of Porphyry who had stated that theurgy was useful to purge the soul and prepare it to receive spirits and to see God. However,

[4] City of God, X, 9. Reply to Celsus, I, 6, 38; VI, 39, 41; VII, 4.

[5] City of God, VIII, 18, 19, 26; IX, 1.

[6] *Idem*, X, 9. "Hæc et alia multa huiusce modi, quæ omnia commemorare nimis longum est, fiebant ad commendandum unius Dei veri cultum et multorum falsorumque prohibendum. Fiebant autem simplice fide adque fiducia pietatis, non incantationibus et carminibus nefariæ curiositatis arte conpositis, quam vel magian vel detestabiliori nomine goetian vel honorabili theurgian vocant, qui quasi conantur ista discernere et inlicitis artibus deditos alios damnabiles, quos et maleficos vulgus appellat (hos enim ad goetian pertinere dicunt), alios autem laudabiles videri volunt, quibus theurgian deputant; cum sint utrique ritibus fallacibus dæmonum obstricti sub nominibus angelorum."

by representing Porphyry as condemning the art in other passages and as after all meaning that it is useful to the worldly part of the human spirit, not to the intellectual and spiritual, Augustine succeeds in evading the difficulty.[7] Moreover, he was inclined to believe that astrological predictions which came true were due to the inspiration of demons, and so would include that art as well as theurgy under his definition of magic.

Origen, on the contrary, in other passages than those in which he denies any connection between Christianity and its followers and magic, does not always maintain the same standard of censure. He seems to know a little more about the subject than he ought.[8] We find him twitting Celsus with not being able to distinguish magi from Chaldæans[9] and again setting his adversary to rights in regard to the definition of sorcery.[10] He also coolly employs the testimony of those skilled in incantations to prove his point[11] and in discussing the power of names, a matter re-

[7] City of God, X, 9, 10.

[8] Origen regarded magic as an art requiring no little learning and skill. Note the passage already cited (Bk. VII, Chap. 4) in which he affirms that Christians expel demons from the sick "with no curious art and employment of magic and of potions but by prayer alone and the simplest adjurations such as the plainest man may use." Evidently the plainest man could not hope to excel at magic. Similarly Augustine distinguishes miracle from magic partly by the fact that "simple confidence" sufficed for the one, while "art" was required for the other. (See note 6.)

[9] Reply to Celsus, I, 58.

[10] *Idem*, IV, 86. "Celsus says, 'If men have any understanding of sorcery, far more informed in this respect are snakes and eagles. For these are thoroughly acquainted with means of warding off poisons and averting evil, and with the virtues of certain stones for the preservation of their young. Whereas if men happen upon these remedies, they think they have gained a wondrous prize.'

"Now first of all I don't understand how he has termed sorcery either the experience or a certain physical intuition of living creatures concerning natural means of warding off poisons. For the usage has been to apply the term sorcery to another thing."

We must agree with Celsus, however, that the virtues attributed to stones were often magical, if not connected with sorcery.

[11] *Idem*, I, 25.

garded by him as profound and sacred, he makes the following remarkable statement:

"If then we succeeded in the preceding passage in showing the nature of powerful names, some of which are used by the erudite of Egypt, or by those of the magi among the Persians who are skilled in words, or the Brahmins among Indian philosophers, or the Samaneans, and so on in each of the nations; and if we were able to demonstrate that the so-called *magic* also is not, as followers of Epicurus and Aristotle think, an entirely chaotic affair but, as those skilled in such matters show, a connected system comprising words known to very few persons; then we affirm that the names Sabaoth and Adonai and others handed down among the Hebrews with great solemnity lie not within the scope of accidental and created things but pertain to a certain mystic theology, concerned with the Creator of all things."[12]

Thus despite his affirmation of the absolute incompatibility of magic and the Christian religion, Origen seems to have recognized a connection between magic and theology,[13] and to have dared on occasion to speak of magic not merely without condemnation but almost with approval.

[12] Reply to Celsus, I, 24. *Ἐὰν τοίνυν ὑνηθῶμεν ἐν προηγουμένῳ λόγῳ παραστῆσαι φύσιν ὀνομάτων ἐνεργῶν, ὧν τισι χρῶνται Αἰγυπτίων οἱ σοφοὶ ἢ τῶν παρὰ Πέρσαις μάγων ο λόγιοι, ἢ τῶν παρ' Ἰνδοῖς φιλοσοφούντων Βραχμᾶνες, ἢ Σαμαναῖοι, καὶ οὕτω καθ' ἕκαστον τῶν ἐθνῶν· καὶ κατασκευάσαι οἱοί τε γενώμεθα, ὅτι καὶ ἡ καλουμένη μαγεία οὐχ ὡς οἴονται οἱ ἀπὸ Ἐπικούρου καὶ Ἀριστοτέλους πρᾶγμά ἐστιν ἀσύστατον πάντη, ἀλλ' ὡς οἱ περὶ ταῦτα δεινοὶ ἀποδεικνύουσι, συνεστὼς μὲν, λόγους δ' ἔχον σφόδρα ὀλίγοις γινωσκομένους· τότ' ἐροῦμεν, ὅτι τὸ μὲν Σαβαὼθ ὄνομα, καὶ τὸ Ἀδωναῖ, καὶ ἄλλα παρ' Ἑβραίοις μετὰ πολλῆς σεμνολογίας παραδιδόμενα, οὐκ ἐπὶ τῶν τυχόντων καὶ γενητῶν κεῖται πραγμάτων, ἀλλ' ἐπὶ τινος θεολογίας ἀπορρήτου, ἀναφερομένης εἰς τὸν τῶν ὅλων δημιουργόν. Διὸ καὶ δύνανται ταῦτα τὰ ὀνόματα, λεγόμενα μετά τινος τοῦ συμφυοῦς αὐτοῖς εἱρμοῦ.*

It may be argued that Origen here distinguishes "so-called magic" from real "magic" which he in other passages condemns as no pursuit for Christians; that he believes that this so-called magic is not truly magic at all. This, however, is a dangerous assumption, for the "so-called magic" is apparently what the Epicureans and the followers of Aristotle mean when they say magic, while Origen himself informs us elsewhere (I,22) that those who conjure demons—i. e., magicians—use such phrases as "God of Abraham" in so doing.

[13] Indeed even when distinguishing between miracle and magic, holy prophecy and divination, he displays a certain nonchalance which is rather surprising. The Jews, he argued, must have had prophets, since, being forbidden

Origen's position was not unsimilar in other matters which hardly come under his own definition of magic but which we may safely regard as offspring of the same mental attitude that begets belief in magic. He was capable of such a notion as that the rite of circumcision was a safeguard against some angel hostile to the Jewish race.[14] Similarly he attributed a rather magical nature to prayer in affirming that Christians "using the prescribed prayers regularly day and night" need have no fear of sorcerers.[15] Indeed he believed that certain words possessed a mystic significance and power, and could not have been of human origin. In one passage he goes so far as to assert that the marvelous results obtained by the use of verbal formulæ are due to the words themselves, not to the things which they signify, since words potent in one language lose their efficacy with translation—certainly a strange statement to come from a Christian who had elsewhere expatiated on the miraculous power of "the simple name of Jesus."[16] Was that name alone, and not deity the cause of miracle?

by the Mosaic law "observers of times and diviners," they had no other means left of satisfying the universal human craving to ascertain the future. It was to quench this popular thirst that the Hebrew seers often predicted things of no religious or other lasting importance. In replying to Celsus's comparison of Christ's miracles to the feats of magicians, Origen admitted that they would be much alike but for the nobler ends which inspired the miracles of Jesus. See I, 36 and I, 68.

[14] Reply to Celsus, V, 48.

[15] *Idem*, VI, 41.

[16] *Idem*, I, 25. Τῆς δ' ὁμοίας ἔχεται περὶ ὀνομάτων φιλοσοφίας καὶ ὁ ἡμέτερος Ἰησοῦς, οὐ τὸ ὄνομα μυρίους ἤδη ἐναργῶς ἑώραται δαίμονας ἐξελάσαν ψυχῶν καὶ σωμάτων, ἐνεργῆσαν εἰς ἐκείνους ἀφ' ὧν ἀπηλάθησαν. Ἔτι δ' εἰς τὸν περὶ ὀνομάτων τόπον λεκτέον, ὅτι οἱ περὶ τὴν χρῆσιν τῶν ἐπῳδῶν δεινοὶ ἱστοροῦσιν, ὅτι, τὴν αὐτὴν ἐπῳδὴν εἰπόντα μὲν τῇ οἰκείᾳ διαλέκτῳ ἔστιν ἐνεργῆσαι ὅπερ ἐπαγγέλλεται ἡ ἐπῳδή· μεταβαλόντα δὲ εἰς ἄλλην οἱανδηποτοῦν φωνὴν ἔστιν ἰδεῖν ἄτονον καὶ οὐδὲν δυναμένην. Οὕτως οὐ τὰ σημαινόμενα κατὰ τῶν πραγμάτων, ἀλλ αἱ τῶν φωνῶν ποιότητες καὶ ἰδιότητες, ἔχουσί τι δυνατὸν ἐν αὐταῖς πρὸς τάδε τινὰ ἢ τάδε.

"With this same philosophy of names is connected our Jesus, whose name has been manifestly seen to have driven out demons from souls and bodies and to have taken possession of those from whom the demons were driven. Moreover while on this subject of names, it should be said that those skilled

Origen, however, disapproved of the favorite pagan methods of divination. He regarded the ordinary casting of horoscopes (*genethlialogia*) as a deceitful art and spoke of it in the same breath with magic, Egyptian animal worship, and the Persian practice of cohabitation with relatives.[17] He had nothing but ridicule for the theory—at least when it was carried to its logical extreme—that history repeats itself with the recurrence of the constellations to their old positions. That Socrates would live again, say the same words and even wear the same clothes in the same old city of Athens seemed to him absurd. Yet he tells us that this theory was held by the Stoics and by the disciples of both Pythagoras and Plato.[18] Though Origen admitted the weight of the testimony of antiquity to the validity of augury, he pointed out that Moses had forbidden it and had classified as unclean the animals commonly used in that art. Origen accordingly concluded that whatever validity augury might possess was due to the agency of demons who predicted by means of birds or other animals, and that the true God would employ no such ignoble channels but the purest of prophetic souls to convey to men a knowledge of the future.[19]

in incantations assert that the same incantation, which when uttered in the proper language works the desired effect, if translated into any other language appears to fall flat and to have no result. Hence not the things signified according to the circumstances but the qualities and peculiarities of the language are the source of whatever power for this or that the incantation possesses."

See also Book VI, Chapter 45.

[17] **Reply to Celsus, VI, 80.** *Ἐξῆς δὲ τούτοις ἐνθεώτατα ἐξ ἀρχῆς ἐδοξε Κέλσῳ λέγειν ἔθνη Χαλδαίους, ἀφ' ὧν ἡ ἀπατηλὸς γενεθλιαλογία νενέμηται τοὺς ἀνθρώπους. Ἀλλὰ καὶ μάγους τοῖς ἐνθεωτάτοις κατατάττει ἔθνεσιν ὁ Κέλσος, ἀφ' ὧν ἡ παρώνομος τοῦ ἔθνους αὐτῶν μαγεία καὶ τοῖς λοιποῖς ἔθνεσιν ἐπὶ διαφθορᾷ καὶ ὀλέθρῳ τῶν χρωμένων αὐτῇ ἐπιδεδήμηκε.*

"In addition to these it seemed good to Celsus to call Chaldæans a nation most inspired from the beginning, by whom illusionary genethlialogy was spread among men. Moreover Celsus places among the most inspired nations the Magi, by whom magic (named after them) was bestowed on other nations to the ruin and destruction of those practising it."

[18] *Idem*, V, 20-21.

[19] *Idem*, II, 88-93.

Yet Origen himself accepted other channels of foreknowledge than holy prophecy. He believed that one might procure valuable information from dreams. Celsus, Origen's dialectical foe, in criticising the story of the flight into Egypt, stated that according to the scriptural narrative an angel had descended from heaven to warn Jesus' parents of the danger threatening the young child. Origen pointed out that the angelic warning came rather in a dream, an occurence which did not seem marvelous to him at all, he said, since "in many other cases it has happened that a dream has shown persons the proper course of action."[20] Comets, Origen stated, appeared on the eve of dynastic changes, great wars and other terrestrial disturbances; and he was inclined to agree with Chæremon the Stoic that they also came as signs of future good, as in the instance of the birth of Christ.[21] Comets indeed he perhaps regarded as on a level with prophetic souls as channels of divine communication, since his view of all heavenly bodies was such, despite his censure of horoscope-taking, that he might easily attribute excessive influence or power to them.

Celsus had censured the Jews and by implication the Christians for worshipping heaven and the angels, and even apparitions produced by sorcery and enchantment, and yet neglecting what in his opinion were the holiest and most powerful part of the heavens, the fixed stars and planets, "who prophesy to every one so distinctly, through whom all productiveness results, the most conspicuous of supernal heralds, real heavenly angels."[22] In reply Origen,

[20] Reply to Celsus, I, 66.

[21] *Idem*, I, 59.

[22] Reply to Celsus, V, 6. The following passage is quoted by Origen from Celsus. *Πρῶτον οὖν τῶν Ἰουδαίων θαυμάζειν ἄξιον, εἰ τὸν μὲν οὐρανὸν καὶ τοὺς ἐν τῷ δε αγγέλους σέβουσι.....ἢ τοὺς μὲν ἐν σκότῳ που ἐκ γοητείας οὐκ ὀρθῆς τυφλώττουσιν, ἢ δι' ἀμυδρῶν φασμάτων ὀνειρώτουσιν ἐγχρίμπτειν λεγόμενους, εὖ μάλα θρησκεύειν τοὺς δ' ἐναργῶς οὕτω καὶ λαμπρῶς ἅπασι προφητεύοντας,.....δι' ὧν αὐτοῖς ἀνακαλύπτεσθαι τὸν θεὸν, τοὺς*

after exonerating Jews and Christians from any worship contrary to that of one supreme God, proceeded with equal pains to demonstrate that although they did not worship the stars they by no means slighted these. He knew, he said, that in general the stars had been assigned by God to all the nations beneath the heavens, but this system of astral satrapies did not extend to God's chosen people.[23] Neither he nor other Christians meant to hold with Anaxagoras that the stars were merely red-hot masses of matter, nor to assert that the heavenly bodies were subject to themselves.[24] He was prepared to grant, if necessary, that the stars were rational beings (*λογικὰ καὶ σπουδαῖα*) and had been "illuminated with the light of knowledge by that wisdom which is the reflection of everlasting light," and that they foretold many things, but even these facts were no reason for giving them the worship due to God alone, who was immeasurably superior even to these exalted spirits, and to whom sun, moon and stars themselves doubtless prayed.[25]

Augustine perhaps felt for the heavenly bodies much the same high respect as Origen manifested, if his assertion that those men insult the stars who impute to that most brilliant and resplendent senate the causing of evil upon the earth is not to be taken as a mere piece of rhetoric.[26] His discussion of matters astrological, however, is limited

φανερωτάτους τῶν ἀνω κήρυκας, τοὺς ὡς ἀληθῶς οὐρανίους ἀγγέλους, τούτους ἡγείσθαι τὸ μηδέν.

[23] *Idem*, V, 10. *φήσομεν ὅτι ὁ Μωϋσέως νόμος ἐπίσταται τούτους ἀπονεμηθέντας μὲν ὑπὸ τοῦ θεοῦ πᾶσι τοῖς ἔθνεσιν ὑποκάτω τοῦ οὐρανοῦ· οὐκέτι δὲ καὶ τοῖς εἰς ἐξαίρετον μερίδα ληφθεῖσι τῷ θεῷ παρὰ πάντα τὰ ἐπὶ γῆς ἔθνη.*

[24] **Reply to Celsus**, V, 11. *καὶ οὐκ ἀτιμάζοντές γε τὰ τηλικαῦτα τοῦ θεοῦ δημιουργήματα, οὐδ' Ἀναξαγορίως μύδρον διάπυρον λέγοντες εἶναι τὸν ἥλιον καὶ σελήνην καὶ ἀστέρας.*

[25] *Idem*, V, 10–12. *καὶ ἐφωτίσθησαν τῷ φωτὶ τῆς γνώσεως ὑπὸ τῆς σοφίας, ἥτις ἐστιν ἀπαύγασμα φωτὸς ἀϊδίου.*

[26] City of God, V, 1. "...magnam cælo faciunt iniuriam, in cuius velut clarissimo senatu ac splendissima curia opinantur scelera facienda decerni..."

to several onslaughts upon the *genethliaci* or *mathematici* of his day; and whatever may have been his opinion of the stars, his attitude towards their would-be interpreters is by no means favorable, as many passages in his works show us.[27] A typical passage is the following from the *De Doctrina Christiana*:

"Nor are they to be excepted from the category of dangerous superstition who are called *genethliaci* from their scrutiny of the days of birth, and now are also spoken of colloquially as *mathematici*. For though they trace out the actual position of the stars when each person was born and even attain some results; yet in that they try to predict either one's actions or the outcome of one's actions they err too far and sell inexperienced men into a wretched slavery."[28]

In his youth, when a follower of the Manichean sect, Augustine had been devoted to astrology and perhaps on this account frequently felt the more bound to warn his readers to have nothing to do with it. In the fifth book of The City of God he enters upon an elaborate argument.[29]

Augustine objected to astrology first because it was fatalistic, attributing to the stars a power possessed by God alone. Assuming, however, that some might remove this objection by arguing that the heavenly bodies simply signified but in no sense caused future events, he proceeded to advance the further objection that at the same moment of time several persons of different subsequent life and

[27] See Augustine's collected works in Migne's *Patrologiæ Latinæ*, Vol. 32, col. 694, 707, 737, 1014; Vol. 33, col. 210; Vol. 34, col. 52, 472, 1455; Vol. 35, col. 456, 476, 747, 1821; Vol. 36, col. 76, 438; Vol. 37, col. 28; Vol. 38, col. 142, 147.

[28] De Doctrina Christiana Bk. II, Cap. 21. "Neque illi ab hoc genere perniciosæ superstitionis segregandi sunt, qui genthliaci, propter natalium dierum consideratione, nunc autem vulgo mathematici vocantur. Nam et ipsi quamvis veram stellarum positionem, cum quisque nascitur, consectentur, et aliquando etiam pervestigent; tamen quod inde conantur vel actiones nostras vel actionum eventa prædicere, nimis errant, et vendunt imperitis hominibus miserabilem servitutem."

[29] See City of God, Book V, Chapters 1-7.

character might have been—indeed probably constantly were being—born under the same quarter of the heavens. Esau and Jacob were quite dissimilar in character and Augustine himself knew of twins who were of different sex and career. Moreover, he tells us in his "Confessions" that he himself was finally led to give up his study of the books of astrologers, from which the arguments of "Vindicianus, a keen old man, and of Nebridius, a youth of remarkable intellect," had failed to win him, by hearing from another youth that his father, a man of wealth and rank, had been born at precisely the same moment as a certain wretched slave on the estate.[30]

Augustine proceeds to elaborate the argument from twins at considerable length, apparently borrowing his logic largely from Favorinus. He considers the objection that twins of dissimilar fate are after all not born at exactly the same instant. This he believes he sufficiently rebuts by the dilemma that the brief interval of time between the two births is either too trifling to account for such complete diversity of character and career as often results, or too important to permit such complete identity of family and rank or such resemblance in physical constitution and liability to disease as is the case. Moreover, if astrologers must take into account such small intervals of time, their predictions can never possess any certain accuracy.

[30] Confessiones, Bk. VII, Chap. 6. See also Bk. IV, Chap. 2 and 3, where Augustine tells that, though through his Manichean scruples against the sacrifice of animals he refused the offer of a haruspex to consult the future for him and insure him success in the poetical contest in which he was to engage at the theatre, yet he was all the time "sacrificing himself to the demons" through his belief in astrology.

The fact that the haruspex offered not to see who was going to win the contest but to make Augustine the winner is suggestive. Like Origen's query why birds did not control their own fate if they knew the future, it shows that the diviners and astrologers did not make the human will the absolute slave of the flight of birds or courses of stars, but believed there were loopholes of escape for the man informed beforehand. Augustine quite ignores this fact in the ensuing argument.

But the astrologers may further object that the time of conception, identical for both twins, determines the qualities in which they are alike while the difference in time of birth regulates their dissimilarities. If this is so, replies Augustine, if a difference in time of birth can alter the future prescribed by the joint moment of conception,—scarcely a fair statement of the astrologers' argument—why also may not twins die at different dates or human free will triumph over the position of the constellation at birth as this in turn has modified the sidereal influence at the period of conception? Moreover, if the moment of conception is to govern the life of the child to be, why may not the father by consulting an astrologer beforehand as to a propitious time control the fate of his offspring and outwit the stars? And of what use is the astrological doctrine of elections—the choosing of propitious days for certain acts by consulting the stars—if one's entire fate has already been settled by the time of birth or conception?

Again if human beings alone are under the control of the stars, why do the *mathematici* name favorable days for setting out vines and trees and shrubs and for breeding cattle? But if vegetation and all animal life are governed by the stars, then each beast must have a separate time of birth from each seed or else we must expect the absurdity of seeds and beast being alike and experiencing the same fate. It is inconceivable, however, that many human beings and brutes and plants do not begin their respective careers, so utterly unlike, at the same instant. Furthermore it is plainly evident that grains are sown at the same time and germinate and ripen simultaneously, and yet meet very diverse fates.

Augustine by this somewhat piddling and sophistical variety of argument, in which the modern reader will readily discern weak points and evasions, disposed to his great satisfaction and not unlikely to the equally great discom-

fiture of his opponents, of the crude superstition that the time and place of birth and nothing else determine with mathematical certainty and mechanical rigidity the entirety of one's life. It was none the less a superstition which was evidently much alive, which the saint felt he must take great care to refute, and to which he himself had once been in bondage. Against a less narrow and hide-bound doctrine, a more practical and intelligent astrology, he does not argue. Exhausted from his arduous assault upon the enemy's first line, he rested his brain and pen and did not attempt to pursue farther the slowly retreating foe. But he made no truce with the enemy. He would not grant that the impulses of the mind were subject to the positions of the stars when even sex, a physical matter, might vary in twins born under the same constellations. Apparently the most he would concede was that it was not absurd to say that the influence of the stars might produce changes in material things, as in the varying seasons of the year caused by the sun's course and the alternating augmentation and diminution of tides and shell-fish due, as he supposed, to the moon's phases. That the astrologers often predicted the future in marvelous manner he admitted, but this success he attributed to the inspiration of evil spirits.[31]

To other stock modes of divination Augustine was apparently equally opposed, although he speaks in one place of the books of the aruspexes and augurs as a "somewhat more permissible vanity" than the worship of idols, entering into compacts with demons, or practising magic.[32] Hydromancy which Numa practised and which consists

[31] City of God, V, 7. "His omnibus consideratis non inmerito creditur, cum astrologi mirabiliter multa vera respondent, occulto instinctu fieri spirituum non bonorum, quorum cura est has falsas et noxias opiniones de astralibus fatis inserere humanibus mentibus adque firmare, non horoscopi notati et inspecti aliqua arte, quæ nulla est."

[32] De doctrina Chritiana, II, 20. ".... Ex quo genere sunt, sed quasi licentiore vanitate, aruspicium et augurum libri."

of viewing the images or adumbrations of demons in water, is clearly a dangerous art and one foreign to the worship of the true God, Augustine declares. Even a pagan senate ordered Numa's books to be burned.[33]

Augustine's apparent freedom from superstition in his attitude toward the celestial bodies characterizes also his view of the natural world at large. He had, it is true, read his Pliny and Solinus and accepted on their authority some rather fantastic statements concerning the properties of material things, just as he quoted Hermes Trismegistus and Apuleius on such themes as the nature of demons. He recounts marvelous qualities of the magnet; asserts that adamant can be broken neither by steel nor fire but only by the application of goat's blood; tells us about Cappadocian mares conceiving from the wind; and hails with delight the salamander's ability to live in the midst of flames as a token that the bodies of sinners can subsist in hell fire.[34] Yet even in regard to such notions Augustine expresses a little hesitancy. Moreover, in his treatise on Christian doctrine he classified as superstitious all ligatures and remedies by means of incantations, characters and suspensions, which he said the medical art condemns and which have to do not with the physical condition but with "occult significations." Some people call them by the name *physica,* but they betray nature in so doing, as Augustine illustrates by giving several examples of superstitious observances.[35] He draws clearly and apparently quite consciously the dividing line between magic—in the broad sense—and science when he remarks,

"It is one thing to say, 'If you drink the juice of this herb, your stomach will not ache.' It is another thing to say, 'If you hang

[33] City of God, VIII, 35.

[34] City of God, XXI, 4, 5.

[35] De Doctrina Christiana, II, 20.

this herb from your neck, your stomach will not ache.' For the one prescription is to be approved as a medicinal application; the other is to be censured as superstitious ceremonial."[36]

Augustine deserves much credit for presenting this homely distinction as a sort of mental guide-post to the world of Christian believers; and one might moralize over the pleasing sight of the great theologian of the early Church leaving for a moment his homilies and commentaries to step to the aid of erring ancient science and to direct its march from the ambush of magic into the safe highway of rational attitude, were it not for a strong suspicion that he copied this same homely distinction from the pages of some pagan writer.

The question of the power of names which so interested Origen is not discussed by Augustine, unless he meant to condemn it as theurgy. But towards belief in the occult significance of numbers he displays a leaning. Six was a perfect number in his estimation, for God had created the world in six days although he might have taken more or less time; and the Psalmist made no idle remark in saying that Deity had ordered all things according to measure, number and weight. Also six is the first number which can be obtained by adding together its factors, one, two and three.[38] Augustine was going on to say that seven was also a perfect number, when he checked himself lest he digress at too great length and seem "too eager to display his smattering of science" and merely added that one indication of seven's perfection was the fact that it was com-

[36] De Doctrina Christiana, II, 29. "Aliud est enim dicere, Tritam istam herbam si biberis, venter non dolebit; et aliud est dicere, Istam herbam collo si suspenderis, venter non dolebit. Ibi enim probatur contemporatio salubris, hic significatio superstitiosa damnatur."

[37] City of God, Bk. X, Chap. 9, 10.

[38] *Idem*, XI, 30. Augustine may seem to have overlooked four, but he probably would have regarded its "parts" as one, two and two.

posed of the first complete odd number, three, and the first complete even number, four.[39]

Both Origen and Augustine were strong supporters and practitioners of allegorical interpretation, which was at least a sort of literary magic. Celsus, Origen remarked, admitted that not merely the uncultured were attracted to the Christian religion but also "moderate and reasonable and intelligent men, and ones apt at allegory,"[40]—a qualification which he apparently regarded as the very cap-stone of culture. Augustine declared that Noah's ark typified the body of Christ, since its proportions were those of the human body, while the door in its side through which the family of the righteous Noah walked in along with such of the animals as were to be saved was emblematic of the spear wound in the side of the Crucified whence flow the sacraments by which believers enter the kingdom. This kingdom, moreover, or at least the city of God sojourning in this world was foreshadowed by the ark, for was not the Church ransomed by the *wood* of the cross? The ark's squared timbers gave promise of the unshaken firmness of God's saints. Its three stories typified faith, hope and love; and probably also had reference to the spiritual harvests of thirty, sixty and one hundred-fold which result respectively from chaste marriage on the ground floor, chaste widowhood on the upper, and chaste virginity on the hurricane deck.[41]

[39] City of God, X, 31. "De septenarii porro numeri perfectione dici quidem plura possunt; sed et liber iste iam prolix est et vereor ne occasione conperta scientiolam nostram leviter magis quam utiliter iactare velle videamur. Habenda est itaque ratio moderationis adque gravitatis, ne forte, cum de numero multum loquimur, mensuram et pondus neglegere iudicemur. Hoc itaque satis est admonere, quod totus inpar primus numerus ternarius est, totus par quaternarius; ex quibus duobus septenarius constat."

[40] Reply to Celsus, I, 27. *ὁμολογεῖ γὰρ καὶ μετρίους καὶ ἐπιεικεῖς καὶ συνετούς τινας καὶ ἐπ' ἀλληγορίαν ἑτοίμους εἶναι ἐν αὐτοῖς.*

[41] City of God, XV, 26.

To sum up, Origen and Augustine furnished a conception of magic which was generally accepted in succeeding centuries. They believed perhaps more firmly than some educated pagans did that there was such a thing as magic. Their disapproval of the supposed art was no more violent and whole-souled apparently than the condemnation of it by most educated pagans. If an Apuleius, exculpating himself from the so-called magic practised by the vulgar crowd, extolled the true magic, as he would have it, of Persia; so an Origen while warning the mass of Christians that they were to leave magic entirely alone, could speak of a magic of the sage as on a plane with theology. Augustine's more uncompromising hostility was probably due in part to his geographical location farther away from the attraction of fantastic Oriental lore, in part to having more centuries of Christian habits and prejudice behind him.[42]

But while Origen and Augustine believed in magic and condemned magic in much the old accustomed way of the respectable citizen from time immemorial, the fact that magic meant to them something different from what it had before gave a new outcome to their belief and condemnation. Magic they regarded as evil not merely because it was employed to injure men and to take away from them liberty of action, but because it employed the services of spirits who were hostile to God. Any dealings with such spirits, whether the evil sorcerer's bewitching or the benevolent physician's charms or the Neo-Platonist's effort at soul satisfaction, were magic. Most arts of divination which had been sanctioned by pagan religions and science were now condemned. The casting of horoscopes was de-

[42] Yet his contemporary, Synesius, Bishop of Ptolemais, passed immediately from being a Neo-Platonist and lover of the occult to the position of a Christian bishop and apparently did not surrender in his new office his beliefs that the scientist could profit by considering the ways of the wizard and that by dreams and the stars men could read their future.

nounced, not merely in the way which Favorinus, Sextus Empiricus and Cicero had denounced it, as unsystematic, inaccurate and unscientific, but as probably involving the aid of evil spirits. Thus under the name "magic" Christianity condemned many more things than had the pagan world.

In those beliefs which neither they nor pagans included under magic but which seem to us to-day to border closely thereon, our authors show that the Christian attitude differed little from the pagan. Augustine, it is true, except in the realm of allegory and of number where his common sense abandons him, seems to refuse to believe in the unnatural and fantastic unless a spiritual force can be made to account for it. Even at that his rationalism is no more remarkable than that of Cicero who nearly five hundred years before had argued against astrology and augury with equal acumen and coolness. Had Augustine, moreover, like Pliny, been brought face to face with the vast accumulation of data handed down by past "scientists" in support of the unnatural and the fantastic, he might like Pliny have made ruinous exceptions to his theoretical scepticism. Had he like Origen fed his mind on the lore of the Orient, he might like him have been on occasion not inhospitable to the occult. For it seems true that he who drank too deeply of the learning of those days was liable to become mentally intoxicated, and that the student of "science" of that age who tried to make detailed statements about particular things was more open to error and magic than the rhetorician, logician or theologian who contented himself with making general assertions. Yet of course for such concrete details men continued to look to the student of "science." It is perhaps worth keeping in mind, moreover, that Origen and Augustine were both clerics and apologists and so professionally bound to take up an irreproachable position morally and dogmatically.

The average lay Christian mind may have been more easy-going in its attitude toward magic and superstition.

Worthy of notice though scarcely to be treated in the present discussion are the references of our authors to the fantastic beliefs of non-Christians, the Stoics and Pythagoreans and Platonists, and the astrology-mad world of their own times. Especially interesting are the beliefs of Celsus as set forth by Origen, who nevertheless hints that Celsus had written a treatise against magic.

LYNN THORNDIKE.
NORTHWESTERN UNIVERSITY, EVANSTON, ILL.

THE RETURN TO THE TRUTH IN MYSTICISM.

IT is our pride and boast that we live in a scientific age. In so far as that means an age free from superstition and devoted to truth, as well as one enriched by the results of applied science, we have cause to rejoice. The scientific spirit is admirable until it becomes negating and exclusive; then it proves our bane and blight. Its affirmations are expansive and releasing, its negations are chilling and binding. If the possession of the scientific spirit means that we must set ourselves either to explore or else deny all that realm of mystery, of intuition, of aspiration, in which religion and art so largely find their home,— thus cutting off sympathy and succession with the racial past,— if it means that we are henceforth to dwell in the light of common day with neither visions nor visitations, in a world wholly tangible, discoverable, matter-of-fact, then perhaps the best thing to do would be to pull the bed-clothes up over our heads and dream again, even though the nightmares, too, returned. It looked for a time as if this disillusioned materialism might become the temper and atmosphere of modern life. But there are indications that the tide has turned and is now flowing back toward that recognition of the realm of the supersensuous, the super-scientific— shall we call it the supernatural?—within which, whether crudely or wisely, the race has found its chiefest hopes and fears, its highest ideals and objects of reverence. Science herself has now pointed the way to a fresh recognition of

the all-embracing reality of the mystical, the unknowable, the spiritual. She has beheld matter take wings and vanish before her eyes. The atom has expanded into an ethereal mansion, in which innumerable ions "rampage and rush about." Herbert Spencer foresaw this collapse of materialism, and his philosophy of the Unknowable is an attempt to recognize the Spiritual and yet to interpret it in terms of the material. We hardly realize as yet how long a step agnosticism took away from materialism, how completely it granted the fundamental premises of idealism. And now comes monism, the mysticism of modern science, and granting even more than agnosticism, again attempts (at least in the person of Haeckel) to explain the greater by the less, mind by matter. Meanwhile, Philosophy watches this invasion of her realm with unconcern, knowing the inevitable outcome.

But although materialism as a philosophy has collapsed, a temper and attitude of mind was created by nineteenth century science which still colors everyday life and more or less dominates the average man. He still remains under the delusion that science has dissipated not only superstition but mystery as well; he thinks the universe completely decipherable, if not already deciphered, and with his fears have also fled his reverences. The result is indifference to the margins of life, concentration upon its sensuous side and its material gains. Hence flow hedonism, immorality, business and political corruption, divorce, luxury, and all that we class as "practical materialism."

Inevitably this spirit has affected current interpretations of Christianity. In the light of the "scientific spirit," history is only an empirical evolution, determined by natural forces and environment. Jesus as a figure in history is wholly explicable, together with the movement—including its illusions and misconceptions—starting from him. As for the experiences of the spirit life, they are phenom-

ena which psychology graciously recognizes and then analyzes and disposes of without reference to super-psychical influence. Let me not seem to imply that these negations are made by science itself; they are unwarranted inferences which the shallow mind draws, be he scientist or layman. Science herself has nothing to say concerning these ultimate problems, often as she has been represented as having solved them.

How far this smug and sensuous philosophy of scientific self-sufficiency, of cosmic comprehensibility, departs from the profounder convictions of humanity, rooted in the philosophy and experience of the ages, hardly need be pointed out. Instead of a sudden emergence into the light of finality, the "scientific age" is likely to prove rather itself a passing phase in the unending quest for truth, a step and only a step onward. Such is the consciousness that is slowly dawning upon thoughtful minds. In other words, everything indicates a return to mysticism. And with it the growths that flourish in the soil of mysticism—religion, poetry, art—will revive. Not that science will be ignored. Rather will it be re-valued and its gains turned to spiritual account. The devout Hindu, concerned solely with finding truth, looks with contempt upon the achievements of English and American engineering. They seem to him child's play, beside the deeper concerns of life, the ultimate problems. That is not the right attitude toward science, but it is more normal than the bridge-builder's indifference to the soul and its problems. Science has quarried rich material for the architecture of the spirit. More than that, science has helped forward, and will help forward, the advance toward ultimate truth. If science has not dissolved mystery, it has at least drawn the boundary line between true mystery and false mystery, and that is a great service. For in coming into right relations with mystery lies our salvation.

In saying that mysticism deserves and will receive fresh recognition and allegiance in the near future, it is essential to discriminate between false mysticism and true mysticism. There is a mysticism which revels in ecstasies, eccentricities, visions, special revelations, individual divine communications; which substitutes fancy for fact, imagination for reality; which disdains the task for the sake of revery; which scorns the human whole in order to exalt the ego. Of this kind of mysticism the world has had too much. It issues in inertia and selfishness. It is neither of the world nor in the world, neither scientific nor sane, neither philosophical nor sensible. And yet there is a mysticism which is sane, rational, unselfish, wide-visioned, which sees farther than telescope can penetrate and goes deeper than plumb can sound, which knows more of nature than science can discover, more of God than scholasticism can compass, more of man than anthropology and psychology can learn. This insight of mysticism—do we think we can dispense with it in this age of the crucible and the scalpel, the statistician and the critic? I use the term mysticism, then, in the broader sense as an attitude of mind, "the attempt," as Inge defines it, "to realize, in thought and feeling, the immanence of the temporal in the eternal, and of the eternal in the temporal." (*Christian Mysticism*, p. 5.)

1. A true mysticism, in this sense, is the only key that will unlock the inmost meaning of nature. Science unbars the outer doors and puts the bare mechanism of nature into our hands. But after all, as Sabatier has said, "the world is ruled by symbols, not by science." And nature is a kingdom of symbols. The poets interpret for us these more secret messages of nature, and in our heart of hearts we care more for them than for all planetary laws and chemical reactions, all physical comforts and electrical appliances. Plato, Francis of Assisi, Words-

worth, Tennyson, Ruskin, Emerson, and all the choir of nature mystics, have disclosed meanings in nature which hold us with a divine fascination. It is in the "thoughts that lie too deep for tears," awakened though they may be by but the meanest flower that blows, that we feel ourselves nearest the eternal realities of nature.

2. A true mysticism is necessary to any large understanding of humanity. He would be a bold man who should profess to know his own selfhood completely. The persistent efforts of an empirical psychology to posit dual or multiple personalities and to exploit and ransack a subliminal consciousness are confessions of the existence of a margin of potencies and possibilities, which leaves personality at best but partially explicable. An old house in Bruges has upon its walls the motto, "There is more in me." There is more in every man, "deep seated in this mystic frame," than he can analyze or fathom. His personality is a meeting-point of self-formations, of racial inheritances and of divine activities, such that none save one above the circle of finite selves can possibly comprehend him wholly. The very conception of *finiteness,* which at once springs up within one when he tries to understand himself, opens an avenue of relationship to an Infinite Self, which must leave him a mystic in spite of himself. And if one cannot comprehend himself, much less can he another self, or that society of finite selves we call humanity.

And since we cannot fully fathom ourselves or humanity, how can we think to fully understand that Man who above all other men fulfilled the wholeness and perfection of personality—Jesus Christ? The men who knew Jesus in the flesh began by thinking that they knew him perfectly. Was he not the son of the carpenter of Nazareth? But bye-and-bye that category failed to exhaust him. Then they called him Teacher, Rabbi; but he outgrew that. Then the great consciousness came to those that knew him best

that he was the Messiah. But even that category proved too limited. So at length after long reflection they said, There is something more than human in him, he is divine, he is the *Word of God.* Neither John nor Paul was a mystic at first; both became mystics as their souls grew in the contemplation of Christ. And as Christ made them mystics, so they made Christianity a mysticism. Such it has remained to this day, finding in Christ values, significances, potencies, which cannot be confined to human terms. Whether Christianity is to retain its mystical element, or whether Christ is to be naturalized, brought within the compass of definite comprehension and limitation, is the great issue now confronting the Church. It is part of the greater issue as between a mystical and a matter-of-fact universe.

3. Once more, a true mysticism alone opens the way to direct and immediate communion with God. It is a daring and high-hearted assumption, from which we in this practical age are inclined to shrink back, that the individual soul can actually commune with God. And yet that has been the claim of Christianity from the very start, never relinquished though often forgotten. Mysticism has held to this faith through all the barren eras of ecclesiasticism, materialism, deism, skepticism,—never failing to maintain the saintly succession of souls very sure of God and of actual, conscious communion with Him. This communion with God, far from depending upon a comprehensive knowledge of Him, deepens in proportion as His absoluteness and incomprehensibility are realized. It was from the mystics that Luther caught the fire with which he kindled all Europe to a new consciousness of God. The German mystics exhibited as noble a harmony of spiritual fervor and practical piety as the world has seen. In England, the Cambridge Platonists showed how perfect a concord mysticism may afford of intellectual strength and spiritual

temper. In our own country it was the mystic (singularly compounded) in Jonathan Edwards that made him great, just as it was the mystic in Henry Ward Beecher and Phillips Brooks that drew the hearts of their hearers and gave to them a fresh sense of God. The history of mysticism shows, it is true, how difficult it is to keep this sense of individual communion with God within the bounds of sobriety and sanity. But with the Christian consciousness as a guide and restraint, the danger of excessive individualism wanes. Christian experience, which we have come to put in advance of all other evidences of Christianity, has within it invariably a mystical element, of differing degree and kind. Each individual Christian has as a rule a certain thrilling, distinctive sense of personal and immediate relation with the Supreme Self, as moving as it is mysterious.

To discredit this type of mysticism as unsound and delusive is to discredit Christianity itself. If "feeling" is prominent in it, it is not an irrational and empty emotion, but that high and holy enkindling which accompanies the most earnest spiritual thinking. As President King has said, "The truly mystical may all be summed up as simply a protest in favor of the whole man—the entire personality." (*Theology and the Social Consciousness*, p. 77.) Even a writer so closely allied with the extravagances of New Thought as H. W. Dresser repudiates all vague, passive, unconcentrated religious revery, and declares, "The foundation of composure is philosophical conviction. It is not faith without reason, but faith rationally scrutinized and developed, that gives this conviction." (*The Power of Silence*, second edition, page 318.) Perhaps no modern scholar has more clearly recognized the meaning and value of true mysticism than Jowett, who, in commenting upon the need of sympathy with mysticism in order to understand Plato, adds: "By mysticism we mean

not the extravagance of an erring fancy, but the concentration of vision in feeling, the enthusiastic love of the good, the true, the one, the sense of the infinity of knowledge and marvel of the human faculties."

Between these two mental attitudes, the thought of our time is vacillating. On the one hand a so-called "scientific," matter-of-fact, exploitable universe; on the other a spiritual, symbolic universe, knowable in part, but packed full of mystery that unfolds only gradually before a developing spiritual insight. Of one of these two conceptions a choice must be made, and the whole tone and character of modern life and conduct, as well as thought, wait upon the issue. Do our worthiest racial ambitions, our highest aims, our truest good, lie in the direction of scientific conquest, physical welfare, material progress, or in the direction of those ethical and spiritual values that belong to a being "moving about in worlds not realized?" The two interests are not antagonistic, but one must be subordinated to the other. The question is one for serious reflection whether a universe shorn of all mystical, spiritual content and meaning would be a true universe, and whether in ceasing altogether to be mystics, men would not also cease to be truly and fully human.

Mysticism is far, indeed, from being a complete and exhaustive philosophy. It fails to do full justice, not only to the rational but to the scientific and to the practical aspects of truth. It is not a return to mysticism itself, as a closed system, that we need, but rather a return to the truth that lies in mysticism—truth that can never be wisely outgrown or permanently thrust aside.

JOHN WRIGHT BUCKHAM.

BERKELEY, CALIFORNIA.

MYSTICISM.

CLEARNESS of thought is the first requirement for the construction of a true philosophy. Most mistakes originate from a confusion of words and a wrong comprehension of their exact significance, but nowhere is a lack of clearness fraught with more consequence than in the domain of psychological questions — involving religion, ethics, and jurisprudence. Mysticism, therefore, is positively dangerous, although we do not deny that under special circumstances it may be beautiful as art and sometimes even wholesome—as wholesome as a medicinal drug would be for a diseased system or a stimulant for one who is tired and cannot easily rouse himself in the moment when all his strength is needed for some good purpose.

THE RETURN OF MYSTICISM.

Some people yearn for mysticism, partly for artistic, partly for sentimental reasons; and there is no harm done, provided common sense cuts off its vagaries; but under all circumstances it would be well to understand the nature of mysticism, the reason of its force, and also its limitations.

We publish in the present number an article by the Rev. John Wright Buckham on "The Return to the Truth in Mysticism." We do not agree with him, but understand very well why he appreciates mysticism, and we gladly take this opportunity to discuss the problem and

present our own solution partly in further extension of and partly in contrast to his views.

Mr. Buckham says:

"The scientific spirit is admirable until it becomes negating and exclusive, then it proves our bane and blight."

Science ought to be negating errors only, for then only is it a search for truth. If science becomes exclusive (unless it excludes the irrational) it ceases to be science, for science is broad and catholic. There are no sects in science, and the truths of science are universal.

Mr. Buckham declares that "everything indicates a return to mysticism," but he wisely distinguishes between false mysticism and true mysticism. The former "revels in ecstasies, eccentricities, visions, special revelations, individual divine communication which substitutes fancy for fact, imagination for reality, which disdains the task for the sake of revery, which scorns the human whole to exalt the ego." He adds, "the world has too much of it." Mr. Buckham then declares that "in coming into right relations with mystery lies our salvation." He praises "the true mysticism, but his only description of it is given in Jowett's definition who says:

"By mysticism we mean not the extravagance of an erring fancy, but the concentration of vision in feeling, the enthusiastic love of the good, the true, the one, the sense of the infinity of knowledge and the marvel of the human faculties." (II, 102.)

If mysticism is the love of the good, the true and the one, if it is a sense of the infinity, i. e., the inexhaustibleness and unlimitedness of knowledge, if it is the awe we feel when thinking of the grandeur of the human soul and its faculties, it is most assuredly a mysticism which omits mystification by mystery or anything mystical. I see no mysticism in what Mr. Jowett calls by that name.

Mysticism is opposed to science, and Mr. Buckham

brings out the contrast between the two. But he narrows the meaning of science. He calls it "disillusioned materialism" limiting it to "matter of fact," i. e., the material universe, and speaks of "scientific self-sufficiency." He further commends agnosticism with its doctrine of the unknowable and identifies that term with "the spiritual."

Now we claim that the field of science is unlimited. Anything that exists, be it material or spiritual (i. e., mental, moral, etc.) is a fit object of science, and there is no problem (unless it be wrongly formulated) that can not ultimately be solved. The spiritual is as knowable as the physical, and the wrongly formulated problem is the illegitimate problem which can not be solved because it is based upon a misconception and is a mere pseudo-problem.

The most important pseudo-problem is the question, "why does the world exist?" All the questions of practical life, how, when, where, why, i. e., through which cause and according to which law of nature has a certain thing or condition originated or did a certain event take place, can be fully answered, provided we can ascertain the facts of the case and are sufficiently trained in exact observation as well as in methodical thought. To a mind that could watch the slightest details of the world processes the universe ought to appear as perspicuous and translucent as glass. All the transformations take place with a regularity that—always provided we know the facts in question—admits of an absolutely precise formulation and description. But why there is existence at all, why there is not in its place an empty blank of non-existence, is the only question that can not be answered, and the problem of this question is a pseudo-problem, for it demands an explanation of the reality or actuality of the world. Why is the real real, why is a fact a fact? When we try to derive the notion of existence from non-existence, we will necessarily fail, and

he who does not see that he is confronted with a pseudo-problem, turns agnostic.

The objective world as it presents itself to our senses in its concrete actuality, possesses three aspects, formulated in three generalizations of substance (or matter) space and time; and their actuality, or indisputable and positive existence implies three *nots,* viz.,

1. Substance did *not* originate from nothing.
2. Space is *not* limited.
3. Time has *not* a beginning nor an end.

The *not* in these three propositions lurks in the ideas of persistence or indestructibility, infinitude and eternity and constituted the *knot* of metaphysics.[1]

There are people who love the mysterious so much as to positively hate clearness of thought, and I will not deny that there is a charm in haziness. In art for instance a certain chiaroscuro is frequently quite effective,[2] but what is recommendable in art is not justified in science. The artist represents reality as it appears to our senses, while the scientist describes the world as it is objectively considered. The artist appeals to our sentiments, and represents or reflects our sentiments, and they are rarely clear even to ourselves; but the scientist's duty is to explain phenomena, and the philosopher, if he is of the right type (if his philosophy is scientific) will follow in the wake of science and aspire to clearness of thought.

There is no need of mysticism in philosophy. If we accept the "that" of existence and dispose thus of the pseudo-problem of the three nots, we shall find that otherwise the world in all its concrete details is explicable—if not always in fact, on account of our lack of sufficient in-

[1] This is the truth that underlies the doctrine of agnosticism which otherwise is and remains a declaration of intellectual bankruptcy and as a philosophy is suicidal. Compare my little book *Kant and Spencer,* pp. 52-56.

[2] See the author's article "The Importance of Clearness and the Charm of Haziness," in *The Open Court,* Vol. III, pp. 2923-4.

formation, yet certainly in theory, and thus we can undauntedly trust in the intelligibility of existence. There is nothing that can not be understood and explained. There are problems not yet ripe for discussion, and further, the range of investigation is unlimited. The universe is too rich to be exhausted and life is freighted with too many potentialities to reach an end of interest; but there is no need of falling a prey to mysticism because there are no bounds that can be set to either progress or science.

Another source of many perplexing pseudo-problems is epistemological, for it lies in the method of science itself. The task of science is to render thoughts (i. e., the representation of things) concise and exact, but all our thinking is done by concentrating our attention upon a definite point. If we wish to see some special object we look at it and our eyes converge upon it. Thus one thing is singled out, while the rest of the world is set aside. If we think of a thing, we establish lines of demarkation and exclude all such qualities and relations as do not belong to the idea under consideration, however important they may be otherwise, even for the thing and its existence. These lines of demarkation do not exist in nature, they are the artifice by which we are enabled to grasp the thing. Nature is an immeasurable and inseparably interconnected whole, and so all our mental discriminations and boundaries are almost as artificial as the lines traced on the map of the stars to combine them in groups called constellations.

This method by which it creates artificial units is indispensable, for otherwise we could not bring order into our world of thought, but if we forget what belongs to our method and what to objective reality, we are apt to take our formulas to be the real things. This mistake is so natural that it is actually made, as may be seen from the generally established habit of calling the uniformities of events laws of nature, as if they were ordinances com-

pelling things to act in a special way—a conception which introduces many erroneous notions into science and philosophy.

If we did not establish artificial lines of demarkation, our mental picture of the world would be a mere blur, as is exemplified in the kinematograph which shows a clear picture only because by a mechanical contrivance (the main point in its invention), it eliminates the continuity of the light proceeding from the object to be pictured, and cuts it up into a succession of instantaneous views, changing little by little in rapid succession. In this way, and in this way only, can we present pictures; the objective world is continuous, but we break it up into discrete units.

This artifice of our intellect which represents discrete objects where there is the flux of a continuous world, brings it about that scientific representation may, within certain limits and for certain purposes become inadequate. We need not, however, denounce science for that reason, but must only keep in mind its epistemological conditions. We must not attribute to the object what belongs to the thinking subject. We must understand the significance of the artificial lines of demarkation, the assumed units of the objects under investigation and all the complications derived therefrom.

How easily pseudo-problems arise when a continuum must be expressed by a system of discrete units, becomes apparent when we want to express geometrical magnitudes in arithmetical terms. Geometry deals with space which is continuous, arithmetic is the science of numbers, which are discrete units. Take the relation of the diameter to the circumference of a circle which are both definite magnitudes, but when translated into the terminology of arithmetic, we are confronted with a task that can only be approximated and never accomplished in full exactness. Mystics find it difficult to comprehend how the number π

can be of any objective validity, since it can not be expressed in definite numbers, but the reason is that we have two incommensurable systems, one of which is continuous, the other discrete. The mystery would indeed be impenetrable if space consisted of concrete parts, and if we were obliged to think that our arithmetical method were inherent also in geometry.

There are a great number of such instances in which two methods are incommensurable; none of them proves that the objective world is unintelligible, but only that the methods of science must be used intelligently. Other instances are the incommensurability of the diagonal with the two sides of its square; or the relation between the fraction $^1/_3$ and its value expressed in decimals, which is 0.333. . . ; or the idea of the unit itself as expressed in its parts in the formula

$1 = ½+¼+⅛+^1/_{16}+^1/_{32}+^1/_{64}+ \ldots$ without end.

We grant that the method of science is onesided and will in some cases for good reasons prove insufficient, but there is an additional difficulty which is perhaps of greater importance to the unscientific multitudes. Science is absolutely devoid of sentiment, and in order to accomplish its end, it must be so. There are people who demand too much of science and expect that it should be all in all. Accordingly we will insist that science is not all of life, and that the intellect must be supplemented by sentiment, and sentiment loves to be clothed in a poetic dress. Reason constitutes the humanity of man and science alone can teach him to climb the heights of existence, but without sentiment, without good-will, without love the rationality of man and all its glories would be like a tinkling cymbal. Though science is devoid of sentiment, it should, and it must, and it will, lead to a refinement of man's heart with its wealth of feeling.

Sentiment is the source from which spring mystic con-

templations and most of the effusions of religious literature. Sentiment dislikes logic and close argument. It does not mind contradictions; on the contrary, it enjoys them; and so we see that mysticism revels in paradoxes. So far no objection can be made; but sometimes sentiment goes further. Sentiment is very powerful in all of us, most so in persons not trained in scientific methods: in them it rules supreme and the ideas which rise from it assume an authority that scorns criticism and rational analysis. The unscientific man believes a certain proposition because it appeals to him. No proof is needed and a refutation is odious. He is intoxicated with his dreams and allows them to take possession of him.

Mysticism, according to our conception of it, is a theory which deems mystification not only allowable but would justify it because it assumes that science is unable to solve the problems of existence and that our sentiments, our imaginations, our flights of fancy will serve the purpose better than any rational analysis of exact science.

Now it so happens that mysticism—at least a certain kind of mysticism—is frequently very useful, but there is no difficulty in explaining the reason. Mysticism is, as it were, a short cut of sentiment to reach a truth which under the circumstances may somehow be unattainable by the intellect. If this truth happens to be a genuine truth, mysticism will be helpful, but if it be an error, a superstition, an aberration, it will be injurious. The shortcomings of mysticism lie in its lack of critical acumen. Sentiment is no proper criterion of truth, and thus it appears that science will after all be indispensable. The best instance of a wholesome mysticism is the conscience of a simple-minded but well-intentioned man. He will instinctively find the right, not by logical argument, but through the guidance of that mysterious inner voice which speaks to him with divine authority.

While conscience appears to be mysterious, its nature, its origin and mode of action are by no means inexplicable.[3] It is nothing more nor less than a great number of the verdicts on our own and other people's actions, gathered up by experience and stored up in the subconscious depths of our soul; and we may add that according to the conditions of man's surroundings and education his conscience will be either reliable or subject to fallacies. Conscience is by no means absolutely reliable. There are many instances of an erring conscience, and the man who suffers from it is sure to be haunted by dangerous errors and will make grievous mistakes.

What is true of conscience is true of all mysticism. If mysticism happens to strike the truth, it will offer to people who are as yet incapable of grasping the full truth, a surrogate of the truth sufficient for their needs. In this sense many prophets and priests and preachers (including the German mystics, such men as Eckhart, Tauler, Jacob Böhme and Angelus Silesius, and also Swedenborg) have done good and useful work, and frequently builded better than they knew. They were guided not by a clear comprehension of the truth but by an instinct which made them feel what they could not yet understand.

With all our appreciation of the poetry of mysticism, we must bear in mind the dangers that are engendered by it. A mystic conviction easily becomes the source of superstition and of superstitious practices. It is perhaps not a mere accident that pious preachers such as Eckhart and Tauler proceeded from the same religious brotherhood as Johannes Nider, Jacob Sprenger, and other advocates of both witch prosecution and heresy trials.

THE PHILOSOPHICAL BASIS OF MYSTICISM.

So far we have spoken of mysticism from a general point of view; but there is a special problem which stands

[3] For details see *The Ethical Problem*, pp. 120-124.

foremost in the systems of those mystics who range as philosophers. It is the problem of eternity in its contrast to time, of infinity in its contrast to limitation in space, of generality and universality in contrast to the particular thing, of the All and One, to the ego or individual self.

Our mental life becomes possible only by seeing the universal in the concrete and by subsuming all our experiences of things that are in time and space under concepts of types which are independent of, or (as we may express it) above time and space. So space with its definiteness of location is contrasted by infinitude; time which determines the origin and end of things has a counterpart in eternity, and the concrete particular objects that exist in time and space are, from the mental point of view, merely transient instances of general types. This is the basis of all mentality, and our very souls could not have risen into existence, if these contrasts were not true realities in this world of which we form a part. There is nothing mysterious in the ideas of eternity, infinitude and universality; on the contrary they are very simple and clear notions, so simple that men untrained in philosophical or scientific ways of thinking are apt to overlook their significance.

Here the mystic steps in. He feels that he has a great truth to proclaim. He does not comprehend it himself, but his soul is full of it and so he pours forth his revelations of it in allegories, in symbols, in mysteries.

It is worth while to enter further into details.

An event that takes place is called actual, (i. e., having the faculty to act, being endowed with energy); a thing that exists is called real (i. e., thingish, having the quality of an object, consisting of matter). The real is always actual, and the actual is always real. The actual happens at a definite moment in time and the real exists in a definite spot in space. All actual reality is concrete, i. e., it is somewhere, somewhen and somehow (viz., it is possessed

of a definite form). It would appear now that anything not real must, as a matter of course, be regarded as non-existent, but such is not the case. At any rate here opinions are divided on the subject.

Among our concepts some denote concrete objects (thingish and actual particulars), while others refer to conditions, and the norms of conditions are neither here nor now, but applicable anywhere. Some of them have been formulated as natural laws which cover whole classes of uniformities. The falling stone is the actual fact, but the conditions of the fall are not matter; they are not things, and yet they determine the nature of the fall, they are as the Greek call it, the "causal" element,[4] or as we now say, following Kant's terminology, "formal"; i. e., they constitute the relational factors. Now it is a peculiarity of reality as well as of our cognition that the conditions of a fall, the formal or relational features of the event, can be formulated in a general statement which is called gravitation, and gravitation is the norm which finds its application in all the innumerable instances of gravitating bodies.

There are some who would say that the gravitating body alone exists while gravitation is a fiction, unreal and therefore non-existent. This is the attitude of most naturalists to-day. But others take the opposite point of view. They say with Plato that all the single cases of gravitating bodies happen and are gone; they are mere instances of the law of gravitation, while the true reality, what Greek philosophers have called "true being" (literally "the beingly being"[5]) is the eternal norm that regulates all single instances of its actualization. The single instances in spite of their concrete reality are to the Platonist purely phenomenal and transient happenings, comparable to a phantasmagoria or to ripples on the ocean of existence.

[4] *τὸ αἰτιῶδες.* [5] *τὸ ὄντως ὄν.*

We do not mean to renew the strife between the two parties, nor will we attempt to prejudice the reader against either view which can easily be done by the very names given to those two sets of ideas. We will limit ourselves to statements of fact, and be impartial in our nomenclature. We say that concrete things are real and the generalities formulated in so-called natural laws are unreal.[6] They exist nowhere. But even the most fanatical believer in the unreality of abstractions will grant that these generalities are not useless fictions. They serve a purpose. The ability to think in abstract terms is the characteristic of man and constitutes the backbone of rational thought. The whole fabric of man's reason is woven of abstractions. Reason is not a concrete thing, not an actual event, not a real thing, not a sense-perceptible object, and yet it is a positive factor in man's existence. This indicates that some unrealities possess significance and can not be regarded as indifferent, let alone non-existent.

It must be understood that we do not contradict the statement that the abstract formula of gravitation is a mere generalization of a certain set of facts; nor would we countenance the proposition that natural laws are metaphysical entities or existences in themselves. We will call them simply uniformities, but we claim and do so without fear of contradiction, that the uniformities of the objective world possess significance in the measure that our abstract ideas are important factors in our life, in our experience, in our destiny.

The paramount significance of these wonderful non-

[6] We use here and in the following pages the terms "real" and "unreal" in their original and limited sense as thingish and not-thingish, i. e., material and unmaterial, but we do not mean to exclude the use of these words in their more general significance. We ourselves have used them in this their common acceptance as signifying anything that possesses objective validity. Thus in the broad sense of the word we would say that space is real, for space is possessed of objective validity and its qualities are quite definite; but in the narrow sense of the word's original and etymological meaning we would have to say, "space is not real," for it is not a concrete and corporeal thing such as stones, bodies, etc.

realities has startled many profound dreamers and in their anxiety to grasp the contrast they propounded paradoxes the keynote of which is the declaration that non-existence is true existence and that all particular existence is sham.

We recognize the contrast that actually exists between realities (i. e., concrete existences or facts) and verities, i. e., significant unrealities: uniformities, eternalities, universalities.

We use the word verity here in the sense of that objective state of conditions which is covered by a truth, i. e., a formula that is true. By truth we understand the subjective idea, by verity that objective condition of things which corresponds to a truth. Both are non-real, one being an idea, the other a general norm; yet both are significant. Truth is a factor in our soul-life and the efficacy of verities is the reason for the importance of truths. The contrast between facts and truths, between the concrete and the general, between the transient actuality and the normative eternality, between what German thinkers distinguish as *Dasein* (reality) and *Sein* (being) finds its typical expression in what may be called the scientific and the religious attitude.

The scientist observes analyses and formulates facts. He deals with the concrete, the real, the actual. The religious man appreciates the significance of the universal and looks upon it not as unreal but as super-real, and his standpoint is perfectly legitimate. The domain of the real is the temporal or secular, of the super-real, the eternal; and the eternal has been pictured by religious poets in the most glowing tints of poetical description as a realm of bliss, as a heaven, as the quintessence of divinity, as God himself, as Nirvana, etc.

The significance of the super-real is well characterized in the first four lines of the concluding stanza of Goethe's Faust, which may here be fitly quoted:

"Things unremainable
But as symbols are meant;
The unattainable[7]
Here grows to event."

SKETCH OF THE HISTORY OF MYSTICISM.

Mysticism appears to have existed since times primordial and may in general be characterized as prescientific religion. It is a conception of the world based not so much on knowledge as on feeling, and we find the main principles of it in all primitive religions of the past and of the present.

The word "mystic" has come down to us from the Greek and denotes one who has been initiated[8] into the mysteries of a religious cult, whereby one entered into a direct and intimate communion with the deity, through the mediation of Orpheus or Dionysus. It was claimed that the mystic was purified of sin and gained an assurance of the immortality of his soul. When paganism broke down, the ideas of mysticism were preserved among the Neo-Platonists, especially in the writings of Plotinus, while the Christian did not hesitate to picture Christ in the catacombs as Orpheus with lyre in hand.

Plotinus was born in Lycopolis in Egypt in 205 and took up his residence in 244 at Rome where he taught his philosophy until his death in 270. The writings of Plotinus,

[7] While the general meaning of these lines is clear enough, the word *unzulänglich* may be interpreted in two different ways. *Unzulänglich* is that which is "not sufficient," and thus Bayard Taylor translates:

"Earth's insufficiency
Here grows to event."

But the meaning is obviously the reverse. Goethe wants to say that "the insufficient shall be done away with forever," and so it seems to me that Goethe used the word *unzulänglich* in the sense of *unerlänglich*, i. e., unattainable, viz., *das wozu man nicht gelangen kann*. Gothe frequently introduced words in an unusual sense; in one poem for instance he introduces the word *Gift*, not in its usual acceptance as "poison," but as a derivative from *geben*, "to give," in the same meaning as the English "gift."

[8] The word *μύστης*, "an initiated one," is derived from *μύειν*, "to shut, to close," which is used here with reference to the eyes. It indicates that blindfolding was an important feature of initiation.

six books of *Enneads*, were edited and published by his disciple Porphyry. His theory is based on the idea that God, the original being, is the One and the Infinite, the absolute Good, the origin whence all creatures come and the goal whither they return. God is essence, matter is non-existence[9] but, as such, matter is the basis of everything[10] (viz., of all concrete and particular objects).

The more a creature moves away from God, the nearer it comes to non-existence. The soul is not matter, but spirit; it is an emanation from God that has been ensnared by sensuality (i. e., the lust for the material). But the soul need not descend further toward non-existence; it can return to its own essence which is God, and this is done by practicing the virtues, first civic virtues, then purifying virtues (asceticism) and finally divine virtues. Comprehension and intelligence are insufficient, the soul must enter into a perfect communion with God, which is attained by perfect passivity and a surrender of its own being. Finally, the soul reaches a stage of utter forgetfulness of all things, and then losing its own being it beholds in perfect silence the source of existence, the norm of the good, the source of its own being.

A revival of the main ideas of ancient Greek mysticism in Christianity took place in the fifth century and continued to play an important part in the history of the Church. It found expression in certain writings, ascribed to Dionysius Areopagita and first mentioned in the dispute of the Severians with the orthodox Catholics, held at Constantinople in 533 A. D.

Dionysius Areopagita (i. e., a member of the Areopagus) is mentioned in the Acts of the Apostles xvii. 34 as one who was converted by Paul. According to Suidas he was a native Athenian, famous for his literary ability and first bishop of Athens. When during his stay at

[9] *τὸ μὴ ὄν.* [10] *τὸ βάθος ἑκάστου ἡ ὕλη.*

Heliopolis he observed the solar eclipse, said to have taken place at the death of Christ, he exclaimed: "Either the Deity suffers or it suffers in sympathy with suffering."[11]

The life of such a man would not have been complete without the crown of martyrdom and this is asserted by later authors.

The writings that go under his name are treatises on the Celestial Hierarchy, the Ecclesiastical Hierarchy, the Divine Names, Mystic Theology, and a number of epistles. They breathe the spirit of Plotinus and may be characterized as a compromise between Neo-Platonism and Christianity. Their author (whosoever he may have been)[12] spiritualizes the doctrines of the Church by applying them to the individual life and seeking a direct union with God through contemplation and ecstatic visions.

The Church was not only not opposed to the mysticism of Dionysius Areopagita, but did its best to recommend his doctrines and have them propagated, perhaps without knowing them sufficiently, for at sundry times some of them were officially condemned as heretical.

Pope Stephan II sent a copy of the writings of Dionysius Areopagita to Pepin, king of the Franks; Hadrian I to Fulrad, Abbot of St. Denis; and Michael Balbus to King Louis the Pious, son of Charlemagne. John Duns Scotus translated them into Latin, and henceforth they exercised a great influence upon the further development of Christian thought. Among the men whose thoughts were more or less molded by them are Bernard of Clairvaux, Albertus Magnus and Thomas Aquinas.

There has been in Germany a religious movement which is a typical and perhaps the most classical instance of the noblest type of mysticism, springing from purely religious

[11] ἢ τὸ θεῖον πάσχει ἢ τῷ πασχόντι συμπάσχει.

[12] He is frequently called Pseudo-Dionysius and is now commonly believed to have written in the fifth century, because he shows too many traces of the influence of Plotinus.

motives. During the troublesome times of the Middle Ages, when the Christian world was greatly harassed by the quarrels between Church and State, between pope and emperor, between Guelph and Ghibeline; when religious institutions were misused for political purposes, and in addition to the troubles created by the authorities themselves, great visitations came upon the people, such as wars, black death, and famines, there were a number of pious people who sought refuge not in the sacraments, not in the means of grace offered by the Church and not unfrequently withheld by interdicts and unjust excommunications, not in the Bible or other religious books, but in the ultimate source of all religious life, in the sentiments of the human heart. They were not antagonistic to the ecclesiastical life and its ceremonies, but they broke through them and tried to dig deeper to the bottom rock of religion. They called themselves *Gottesfreunde,* "friends of God," with reference to the word of Jesus, who in John xv. 15, said:

"Henceforth I call you not servants, for the servant knoweth not what his master doeth; but I have called you friends for all things that I have heard of my father I have made known unto you."

There were many prominent men among these friends of God, and we may mention of those who were leaders of the movement, Master Eckhart[13] of Strassburg (about 1260-1300); Nikolaus of Basel (burned at the stake as a Beghard at Vienna about 1387); and his great disciple and friend, Tauler of Strassburg, a Dominican monk (1300-1361); further Henry Suso of Swabia, also a Dominican (died 1366); Johannes of Ruysbroek, surnamed *Doctor Ecstaticus* (died 1381); Henry of Nördlingen; Rulman Merswin (1307-1382), a merchant who retired from the world and founded a monastery; and the author of the

[13] Also spelled Eckardt.

Theologia Germanica. The religion of these mystics resembles greatly even in important details the doctrines of Buddhism, especially in so far as it insists throughout on the utter surrender of the ego. The idea of self together with all particular existences is regarded to be the cause of all evil, and sin as well as hell would be eradicated if selfhood were done away with.

We are mainly interested in that mysticism which is a religious interpretation of the philosophical problem of life and we will here limit ourselves to a presentation of the leading ideas of the *Theologia Germanica* and the epigrams of Angelus Silesius. The former has been introduced to the English public by Susanna Winkworth through a good English translation, but is by far not as much known as it deserves to be; but Angelus Silesius has to my knowledge never been translated, and there are few who are familiar even with his name.

THEOLOGIA GERMANICA.

Theologia Germanica is the title of a book whose author is unknown, but he must have lived between Tauler and Luther, and was probably one of Tauler's disciples because he quotes a saying of Tauler's in one of his chapters. Luther edited the book and recommends it in high terms, saying that after the Bible and St. Augustine there is no book from which he has learned more about God and Christ and man and all things. The book was written in the middle of the fourteenth century.

According to the *Theologia Germanica,* God, the Perfect, is like the sun, the particular is a brightness or visible appearance which floweth out from the sun. It appeareth to be somewhat, this or that, and it is called a creature but it is not the Perfect. (Chap. I.)

It is peculiar that in his first definition of what the

theologian would naturally call God, the author of the *Theologia Germanica* avoids the word God. He says:

"The things which are in part can be apprehended, known, and expressed; but the Perfect cannot be apprehended, known, or expressed by any creature as creature. Therefore we do not give a name to the Perfect, for it is none of these. The creature as creature cannot know nor apprehend it, name nor conceive it."

It is further stated that the "creature-nature" of the creatures is "that by which it saieth 'I and myself,' but if we wish to be saved, the self and the like must all be lost and done away with.... So long as we think much of these things, cleave to them with love, joy, pleasure or desire, so long remaineth the Perfect unknown to us."

The creatures, especially the self, the ego, etc., are called accidents, and the Perfect alone is true substance, or essence.

It will be noticed that the words "substance" and "essence," and also "accident," which are philosophical terms of the schoolmen borrowed from Aristotle, play an important part in Spinoza's system where they are used in the same, or approximately the same, sense.

Our author reverts again and again to the subject that the source of all evil is separate existence. We read in Chap. II:

"What did the devil do else, or what was his going astray and his fall else, but that he claimed for himself to be also somewhat, and would have it that somewhat was his, and somewhat was due to him? This setting up of a claim and his I and Me and Mine, these were his going astray, and his fall. And thus it is to this day."

The same idea is expressed in Chap. XXXIV:

"Be assured, he who helpeth a man to his own will, helpeth him to the worst that he can. For the more a man followeth after his own self-will, and self-will groweth in

him, the farther off is he from God, the true Good. For nothing burneth in hell but self-will. Therefore it hath been said, 'Put off thine own will, and there will be no hell.'"

And further down, in Chap. XLIX, we read:

"If there were no self-will, there would be no devil and no hell. When it is said that Lucifer fell from heaven, and turned away from God and the like, it meaneth nothing else than that he would have his own will, and would not be at one with the Eternal Will. So was it likewise with Adam in Paradise. And when we say Self-will, we mean, to will otherwise than as the One and Eternal Will of God willeth."

There is no pessimism about this conception, for the world itself should not be surrendered, but only self-will. We read in Chap. L:

"What is Paradise? All things that are; for all are goodly and pleasant, and therefore may fitly be called a Paradise. It is said also, that Paradise is an outer court of heaven. Even so this world is verily an outer court of the Eternal, or of Eternity, and specially whatever in Time, or any temporal things or creatures, manifesteth or remindeth us of God or Eternity; for the creatures are a guide and a path unto God and Eternity. Thus this world is an outer court of Eternity, and therefore it may well be called a Paradise, for it is such in truth. And in this Paradise, all things are lawful, save one tree and the fruits thereof. That is to say: of all things that are, nothing is forbidden and nothing is contrary to God but one thing only: that is, self-will, or to will otherwise than as the Eternal Will would have it. Remember this. For God saith to Adam, that is, to every man, 'Whatever thou art, or doest, or leavest undone, or whatever cometh to pass, is all lawful and not forbidden if it be not done from or according to thy will but for the sake of and according to

My will. But all that is done from thine own will is contrary to the Eternal Will.' "

On this contrast between selfhood and allhood is based the Christology of the *Theologia Germanica.* The Saviour must partake of both, natural manhood and Godhood, otherwise we can not be healed. We read in Chap. III:

"By whom, and on what wise was that healing brought to pass? Mark this: man could not without God, and God should not without man. Wherefore God took human nature or manhood upon Himself and was made man, and man was made divine. Thus the healing was brought to pass. So also must my fall be healed. I cannot do the work without God, and God may not or will not without me; for if it shall be accomplished, in me, too, God must be made man; in such sort that God must take to Himself all that is in me, within and without, so that there may be nothing in me which striveth against God or hindereth His work....

"And in this bringing back and healing, I can, or may, or shall do nothing myself; but just simply yield to God, so that He alone may do all things in me and work, and I may suffer Him and all His work and His divine will. And because I will not do so, but I count myself to be my own, and say 'I,' 'Mine,' 'Me' and the like, God is hindered, so that He cannot do His work in me alone and without hindrance; for this cause my fall and my going astray remain unhealed. Behold! this all cometh of my claiming somewhat for my own."

Like Christ, man partakes of two natures. He is a particular being and as such belongs to the earth, and he is divine and as such he is like God. As the former he is Adam, and as the latter he is Christ. Adam is also called the old man and Christ the new man. We read:

"All that in Adam fell and died, was raised again and made alive in Christ, and all that rose up and was made

alive in Adam, fell and died in Christ. But what was that? I answer, true obedience and disobedience. But what is true obedience? I answer, that a man should so stand free, being quit of himself, that is, of his I, and Me, and Self, and Mine, and the like, that in all things, he should no more seek or regard himself, than if he did not exist, and should take as little account of himself as if he were not, and another had done all his works. Likewise he should count all the creatures for nothing. What is there then, which is, and which we may count for somewhat? I answer, nothing but that which we may call God. Behold! this is very obedience in the truth, and thus it will be in a blessed eternity. There nothing is sought nor thought of, nor loved, but the one thing only."

Christ himself, so long as he lived in the flesh, was not free from the evils of particularity. He was subject to suffering on the one hand, yet on the other hand he was perfect above all things. We read in Chapter VII that Christ had two eyes, one eye of the spirit wherewith he looked into eternity and another eye on account of his humanity wherewith he looked into time; and one of them was a hindrance to the other.

The created soul of man has also two eyes, and these two eyes can not both perform their work at once. If the soul shall see with the right eye into eternity, then the left must close itself and refrain from working, and be as though it were dead. (Chap. VII.)

The spiritual man will have troubles so long as he lives, in the same way as Christ had troubles. We read in Chapter XVIII:

"Of a truth we ought to know and believe that there is no life so noble and good and well pleasing to God, as the life of Christ, and yet it is to nature and selfishness the bitterest life. A life of carelessness and freedom is to

nature, and the Self and the Me, the sweetest and pleasantest life, but it is not the best; and in some men may become the worst. But though Christ's life be the most bitter of all, yet it is to be preferred above all."

In Chapter XXXVII we read that the cause of the sorrow of the God-man was sin, and we can not avoid the same fate even unto death. We read:

"And therefore where God is made man, or when He dwelleth in a truly Godlike man, nothing is complained of but sin, and nothing else is hateful; for all that is, and is done, without sin, is as God will have it, and is His. But the mourning and sorrow of a truly Godlike man on account of sin, must and ought to last until death, should he live till the Day of Judgment, or for ever."

There are three stages of salvation. The first is purification; the second, enlightenment; and the third, union. The union with God consists in love, the importance of which is treated in the forty-first chapter:

"Thus may we perceive that knowledge and light profit nothing without Love.... Let a man know much about God and divine things, nay, dream that he seeth and understandeth what God Himself is, if he have not Love, he will never become like unto God, or a 'partaker of the divine nature.' But if there be true Love along with his knowledge he cannot but cleave to God, and forsake all that is not God or of Him, and hate it and fight against it, and find it a cross and a sorrow.

"And this Love so maketh a man one with God, that he can nevermore be separated from Him."

The love of the mystic is not limited to God but is embracing all things. There is nothing that he hateth except sin, as we read in Chapter XLVI:

"Now he who shall or will love God, loveth all things in One as All, One and All, and One in All as All in One; and he who loveth somewhat, this or that, otherwise than

in the One, and for the sake of the One, loveth not God, for he loveth somewhat which is not God."

As Christ has not been spared hell, so all his followers must pass through the same ordeal. We read:

"Christ's soul must needs descend into hell, before it ascended into heaven. So must also the soul of man.

"This hell and this heaven are two good, safe ways for a man in this present time, and happy is he who truly findeth them.

"For this hell shall pass away,
But Heaven shall endure for aye."

In his explanation of the sayings of Christ, we find that the author of *Theologia Germanica* falls back upon truth itself, and by truth he means his inner consciousness or his intuitive and immediate conception of truth. He says in regard to Christ's demand to forsake and part with everything:

"Though this had never been declared unto us, yet the truth herself sayeth it, for it is so of a truth. But so long as a man clingeth unto the elements and fragments of this world (and above all to himself), and holdeth converse with them, and maketh great account of them, he is deceived and blinded, and perceiveth what is good no further than as it is most convenient and pleasant to himself and profitable to his own ends. These he holdeth to be the highest good and loveth above all."

Throughout these expressions we find the contrast between good and evil as based in the universal and the particular. God as well as the devil denote this contrast, and sometimes one, sometimes the other takes possession of man. Chapter XXII expresses this contrast in plain terms:

"It is written that sometimes the devil and his spirit do so enter into and possess a man, that he knoweth not what he doeth and leaveth undone, and hath no power over himself, but the Evil Spirit hath the mastery over him,

and doeth and leaveth undone in, and with, and through, and by the man what he will. It is true in a sense that all the world is subject to and possessed with the Evil Spirit, that is, with lies, falsehood, and other vices and evil ways; this also cometh of the Evil Spirit, but in a different sense.

"Now, a man who should be in like manner possessed by the Spirit of God, so that he should not know what he doeth or leaveth undone, and have no power over himself, but the will and Spirit of God should have the mastery over him and work, and do, and leave undone with him and by him, what and as God would; such a man were one of those of whom St. Paul saith: 'For as many as are led by the Spirit of God, they are the sons of God,' and they 'are not under the law, but under grace,' and to whom Christ saith: 'For it is not ye that speak, but the Spirit of your Father which speaketh in you.' "

"For the Self, the I, the Me and the like, all belong to the Evil Spirit, and therefore it is that he is an Evil Spirit. Behold one or two words can utter all that hath been said by these many words: 'Be simply and wholly bereft of Self.' But by these many words, the matter hath been more fully sifted, proved, and set forth."

This movement of the friends of God takes its stand, not upon church authority, but upon the factors of religious life, without however being hostile to the Church, for it regards its institutions as means of salvation which are important though not indispensable. They are educational, and those souls which have not yet attained to perfect truth should not abandon them too soon. Tauler is quoted as having said:

"There be some men at the present time, who take leave of types and symbols too soon, before they have drawn out all the truth and instruction contained therein."

And our author adds:

"Hence they are scarcely, or perhaps never, able to understand the truth aright."

The quoted passages are samples of the mystic's attitude, and the same ideas are repeated again and again, but they are even more forcibly and poetically expressed by Angelus Silesius in his *Cherubinean Wanderer*.[13]

ANGELUS SILESIUS.

Johannes Scheffler, better known under the name of Angelus Silesius, was born in 1624 in Breslau, of Protestant parents, and his family belonged to the aristocracy of the country. He went to the universities of Strassburg, Leiden, and finally Padua, to study medicine, and took his doctor's degree at the latter place in the year 1647. He served three years as court physician to Duke Silvius Nimrod of Oels, 1649-1652, and in 1653 he became a convert to the Roman Catholic Church. He had become dissatisfied with Protestantism, which in those days was more than ever before and after, given to dogmatic speculations. Having found some friends among the Jesuits of Breslau, he was attracted by the artistic and mystical atmosphere of their faith and, as is habitual with converts, he repudiated Protestantism as zealously as he espoused the cause of the Church of Rome. In the year 1661 he joined the order of Minorites, and on July 9, 1677, he died of consumption in his fifty-third year.

When Johannes Scheffler turned Catholic he adopted the name of Angelus Silesius, and called himself forthwith Scheffler Johannes Angelus Silesius. His "Cherubinean Wanderer" was printed by the Society of Jesus at Vienna in 1657 and received the imprimatur of the Roman Catholic Church.

Angelus Silesius (as he is commonly called, omitting his original name Johannes Scheffler) is very little known

[13] *Cherubinischer Wandersmann.*

to English readers; and we must grant that a perusal of all the 1676 little poems of his book would be extremely monotonous, but among the chaff there are grains of gold, and we have selected the most striking verses, and offer them here to our readers as some of the most beautiful expressions of the thought that has been produced by mysticism, not the mysticism of vagaries and vain speculations but the noble mysticism of Eckhart and Tauler, which is founded upon a deep philosophical conception.

It will be noticed that the God-conception of Angelus Silesius would appear to many, if it were expressed in a dry dogmatic formula, as pure atheism. He speaks of God as a mere naught, and even less than naught; he denies that the deity thinks; he does not believe in providence because God can not see ahead. God is nowhere, and the expression "God is" is a mere *soi disant*, a trope, i. e., an expression which can not be taken literally, in the sense in which we speak of ourselves as existing.[14] If God could be said to be something he would be such only in name. The views of self in the *Cherubinean Wanderer* of Angelus Silesius, like the views of the author of *Theologia Germanica*, are quite Buddhistic, and salvation consists in freeing one's self from the egotism and all the narrowing limitations of selfhood. We are saved by self-annihilation. Nevertheless the soul of man is divine, provided the idea of selfhood be overcome. Indeed, it is as great as God himself, yea it may be more than God. The soul is infinite and heaven and earth are too small for it.

In this sense the creation is an actualization of God, and the actualized God may be greater than the God who

[14] The use of *eigentlich* in the line here referred to is very idiomatic. When Angelus Silesius says: "*Gott ist nur eigentlich*," he means: "If we say 'God is,' the words are to be taken as true, *nur eigentlich*, i. e., only in a particular sense." The word *eigentlich* is derived from *eigen*, i. e., "own," and conveys the ideas of all qualities belonging to or being self, i. e., property, proper, properly, and particular. Thus its derivative *eigentlich* has acquired the sense of "properly speaking"; e. g., the phrase *nicht eigentlich* means "not exactly," and *nur eigentlich*, "only in a special sense."

is still a mere naught. God is within his creatures, and he is God everywhere. From the standpoint of this mystic contemplation all creatures are alike before God; the fly is as important as man himself, and to Him the frog's croaking is as beautiful as the lark's song.

The indifference of God toward all implies that before Him the saint and the sinner are alike, but our deeds are not for that reason indifferent. The divinity of God is realized in us according to the life we lead. Nor must we wait for another life but do our duty here. We conquer the evils of life through not having our own will, but doing God's will. Death is called our best friend, because he is the liberator from selfhood, and the thought of self—nothing else—is hell. When body and soul are healed (i. e., at the termination of our life) we become God ourselves.

Though Angelus Silesius was a zealous Roman Catholic it is very difficult to conciliate his mysticism with Church doctrines, unless it be granted that the Christian dogmas are exoteric and admit of an esoteric interpretation. We find that, in the same way as in the mysticism of the friends of God, Christian dogmas loom up in the background, but the dogma becomes indifferent in comparison to its meaning: We feel that to the mystic it is of no consequence whether the facts of the life of Jesus are true or not, but it is of paramount importance to him that God should be born in our own soul. Our own deification is the whole burden of the story of Christ, and in the same way all the dogmas have no other purpose than to symbolize spiritual truths and to help us actualize them in our lives.

In spite of the practical significance of Angelus Silesius's mysticism, he entered deeply into philosophical speculations and we notice that he anticipates Kantian idealism. Not only lies the center of the world and all its wealth within ourselves, but even time and space are declared

to be functions of the soul. They are parts of our *Weltbegriff*, i. e., our conception of the world .

There is a thoughtful pun in one of the epigrams on time. The balance-wheel of a watch is called *Unruhe* in German, which literally translated means "unrest." Time is made, says Angelus Silesius, by the clock-work of our senses; if we stop the balance-wheel, which is the restlessness of our heart, we stop time itself and live in eternity.

Yet Angelus Silesius would be no mystic if he rated comprehension higher than sentiment. It is true he prizes only that simplicity of heart which is accompanied with wisdom; he scorns that simplicity which is mere stupidity, but he places love higher than knowledge and science, for through love only we gain an immediate admission into God's presence.

We must bear in mind the German original with its crude rhymes and archaic language if we want to appreciate Angelus Silesius in an English translation, and a close study of these epigrams has convinced us that the naïveté of the style is particularly adapted to the thought, both of which we have endeavored to preserve in our English version.

No one can read these lines, be he religiously inclined or not, without being interested in the man and in his attitude towards the world. By the side of the pious fervor which permeates his poems, there is an undercurrent of the most radical thought which, if it were expressed in prose and without the religious intent, would be regarded by many as sheer infidelity.

After these comments we let Angelus Silesius speak for himself.[15]

[15] We were unable to procure for the preparation of our present version an original edition of the *Cherubinischer Wandersmann*, and had to be satisfied with Otto Erich Hartlebens little book of extracts. On going to press Mr. Francis C. Russell, of Chicago, calls our attention to a translation of some epigrams, culled from Angelus Silesius, by Mr. A. F. Kroeger, and published in the *Journal of Speculative Philosophy*, Vol. IV, pp. 31-37. Most of them

EXTRACTS FROM THE "CHERUBINEAN WANDERER."

We say God needeth naught,
For gifts He doth not pine;
If that be true, why wants
He this poor heart of mine?

We pray, "O Lord my God,
Thy will be done, Thy will!"
And yet no will He hath;
For e'er and aye He's still.

God resteth not himself,
Nor in exertion irketh.
His very work is rest,
Yet when He rests, He worketh.

God is the purest naught,
He hath nor now, nor here.
The more thou grop'st for Him,
The more He'll disappear.

The tender Deity
Is naught and less than naught.
Who naught in all things sees,
He finds God whom he sought.

God thinketh naught; for if
He thought, or planned, or wot,
His mind would vacillate,
And that behooves him not.

God never looks ahead;
And thus it is a lie,
Whene'er to measure Him
By providence you try.

Mere trope to say God *is*!
Nor loves, nor thinketh He
As creatures, such as I
And you, are said to be.

Who asketh gifts of God,
How piteously he strayeth!
He to a creature, not
To the Creator prayeth.

Think'st thou, poor man, if thou
In song thy voice loud raisest,
That in the proper way,
The quiet God thou praisest?

The uncreated God
In time grows here to be
What ne'er He could become,
In all eternity.

This all is but a play
Made by the Deity,
Who for His very sake
Designed creatures to be.

What in eternity
God wants and has devised,
His thoughts in me He now
Beholdeth symbolized.

A heart that to God's will
Submits in patience mute,
Loves to be touched by Him:
It serves God as His lute.

God is indeed pure naught,
Yet if He something were,
He'd only be in me,
His chosen minister.

How blessèd is the man
Who willeth not nor knoweth,
And who—hear me aright!—
On God no praise bestoweth.

are different from those contained in our collection, but all bear the same character.

Whoever with one glance
Above himself can soar,
He with God's angels can
Sing *Gloria* evermore.

The Godhead is the sap
By which I grow and blow;
Its holy spirit 'tis
That me inspireth so!

God is in me the fire,
And I, beam of his light.
Thus we together are,
And closely we unite.

God is eternal rest,—
For naught e'er willeth He.
If naught thou willest, thou
As much as God shalt be.

Above thee lifteth thee
But nihilatedness.
Who most is turned to naught
Will most of God possess.

Who without feeling loves,
Without cognition knoweth:
He is more God than man
And by that name he goeth.

Whoso immovable
In joy and pain hath proved,
From God's own likeness he
Can not be far removed.

I am (What majesty!)
Eternity's own son;
By birth a noble king,
God's glory on a throne.

Am not outside of God
Nor He outside of me!
Am his effulgent light;
Source of my glory He.

Here, flow I still in God,
A brook of time, ywis;
There, I myself shall be
The sea of lasting bliss.

I am as great as God,
He is as small as I.
He can't above me stand,
Nor I beneath Him lie.

To what thou lov'st thou shalt
Be changed through thine own dearth,
To God, if thou lov'st God,
To earth, if thou lov'st earth.

I know, deprived of me,
God could not live a wink.
Were I annulled, He too,
Must needs to nothing sink.

The world too narrow is
For me, and Heav'n too small.
Where then for this my soul
Shall I find room at all?

Man never will possess
Perfect beatitude,
Until what single is
Swallows all otherhood.

Rain rains not for itself,
Nor to himself adorn
Shineth the sun; so thou
Not for thyself art born.

Communion giveth rest.
It is from ownhood's state
That pains and woes arise,
War, persecution, hate.

Naught else will ever thee
To hell's deep jaws consign,
Than the curs'd heinous thought,
Take heed!—"The mine and thine."

The more thou thine own self
Out of thyself dost throw,
The more will into thee
God with his Godhood flow.

Walk out, God walketh in;
To God live, die to thee;
Do naught, thy duty's done;
Be not, and God will be.

No exit but t'will cause
To enter a new start;
I empty mine own self,
God comes to fill my heart.

A man of mind composed
Is always one and free.
How, between God and him,
Can there a diff'rence be?

The sea is sea throughout,
E'en finest spray of sea.
Say how in God pure souls
Aught else but God may be!

My spirit's deep abyss
Clamors with much ado
For God's abyss. Now which
Is deeper of the two?

Creatures are more in God
Than in themselves they be.
When gone, they still remain
In Him eternally.

Naught is without a voice;
And God in million ways
In all His creatures hears
The echoes of His praise.

The nightingale will not
The cookoo's note deride,
But if my song be not
Like yours you scoff and chide.

Why can we humans not
Like unto little birds
Shout all harmoniously
Our different songs and words?

All creatures are the voice
Of the eternal Word.
With grace or wrath it sings
Itself, and thus 'tis heard.

God hath no preference,
With all He is in tune.
As gladly with the fly
As thee, doth He commune.

Unto the croak of frogs
With equal care God harks,
As to the joyous song
Of soaring meadow larks.

All works are same to God;
He loves the saint while drinking
As much as when in prayer
Upon his knees he's sinking.

From first beginning 'til
To-day, a creature's quest
Has never been aught else
Than its creator's rest.

Friend, envy not the world!
Although its fate, you see,
Is its own wish and deed,
It is a tragedy.

The circle in a point
Is centered, fruit in seed,
The world in God. Who seeks
Therein is wise indeed.

Whoe'er his senses turns
Within his soul, he findeth,
He hears what is not said,
He sees when night him blindeth.

Naught 'tis that pusheth thee—
Thyself, thou art the wheel
Which turneth by itself
And never rest will feel.

Oh run for wisdom not,
Nor wit, across the sea.
On love alone depends
The soul's true dignity.

Thy wealth in thee must lie.
What thou hast not in thee,
Were it the whole great world,
A burden would it be.

Yourself you make the time,
Your senses are the clock.
You stop the balance wheel,
And time at once you block.

They say that time is swift.
Whoever saw it fly?
Within our world of thought
Unmoved we find time lie.

Who time takes not as time,
Whose sorrow is no sorrow,
Whose yest'reen is to-day
And whose to-day is morrow,
Who counteth all the same:
He e'en in time will be
In the longed for estate
Of sweet eternity.

Thou art not in a place,
The place thou'lt find in thee.
Discard it, and e'en now
Appears eternity.

No after nor before!
What shall to-morrow be
In its true essence, God
Sees in eternity.

All accident must go,
And false appearance, too.
Essence thou must become
Without an earthly hue.

Go where thou can'st not walk;
See what thou canst not see;
Hear what is without sound,
And where God speaks, thou'lt be.

Stop man! where dost thou run?
Heav'n lies within thy heart.
If thou seek'st God elsewhere,
Misled, in truth, thou art.

Rest is the highest good;
And if God were not rest,
For Him I'd close mine eyes
To make Him truly blessed.

The rose is without why.
It blows because it blows,
It thinks not of itself,
And no display it shows.

The rose which here unto
Thine outer eye is shown,
From all eternity
Thus in God's sight hath blown.

Descend, man, sink thee down:
Thy rising hath begun.
Cease thou from further walk:
Then will thy race be run.

What I become I was
What I have been I'll be.
Such, soul and body healed,
I'll be eternally.

Naught stronger is than God,
Yet can He not forfend,
That I whate'er I will
Should not will nor intend.

Man should essential be;
For, when this world is gone,
All accident is past,
The essence still lives on.

Here must our deeds be done!
I don't believe such thing
That who no kingdom wins
Can ever be a king.

If thou art great, my friend,
Then do not stop nor stay;
From one light, thou must go
Unto another day.

Thy bundle throw away!
Who wants to war and fight,
Must bear no bag of gold;
His shoulders must be light.

There's need of solitude!
But if thou not commune,
Then thou shalt lonely be
As in a desert soon.

You will have heav'n on earth,
The sweetest life to live,
If you yourself with love
To contemplation give.

Let mediation go!
If I'm to see my light,
I want before my face
No wall to check my sight.

Becom'st thou not a child,
Thou enter'st not at all
Where God's own children are;
The door is much too small.

Simplicity I prize
If God hath giv'n it wit;
Unwise simplicity
Deserves the name no whit.

Simplicity means, not
To be on baseness bent;
But in the cause of good
Humbly be diligent.

Of sleep there are three kinds:
Sinners are death-oppressed,
The faint in nature lie,
In God true lovers rest.

Love is the sage's stone;
It takes gold from the clod
It turns naught into aught,
Transforms me into God.

Like unto Death is Love;
It deadens all my sense,
It breaks in me my heart
And leads my spirit hence.

Would'st thou discern which Love
Be false, which true and pure,
Observe: false love seeks self—
Will not in grief endure.

Young love storms like new wine
In wildest fermentation.
Old love is still and clear,
Strong through tranquilization.

With but one kiss the bride
Deserveth more of God,
Than hirelings may earn
However much they plod.

If thy soul virgin be,
And like Maria pure,
It soon will pregnant be
As God's own paramour.

God as a child is born
In stillest, darkest night,
Whereby He has restored
What's lost by Adam's plight.
Thus in a creature dark,
Here in thy soul so still,
God is becoming man
And that will mend all ill.

I don't believe in death.
Though hour for hour I die,
Each time upon each death
To better life I hie.

I do declare that death,
Because it makes me free,
The best thing in the world,
The very best must be.

Into God's presence Love
Quite unannounced will burst,
While wit and learnedness
Must antechamber first.

We sum up. If mysticism claims any superiority over science, if it undertakes to check man's endeavor to attain to clearness of thought, if it declares the mysterious, the mystical, the unknowable, the unthinkable or anything irrational to be the highest reality or the foundation of all existence, if it would try to oust science, or reason, or methodical inquiry from its office as the ultimate criterion of truth, we must protest. But in doing so we do not mean to discard mysticism as useless.

We acknowledge the truth that science does not exist for its own sake but serves an ulterior purpose, which is its application to practical life, and finds its ultimate fulfilment in the actualization of our moral ideals, truthfulness, justice and universal goodwill. Irrational sentiment is worthless, but, on the other hand, any knowledge that excludes the cultivation of sentiment and does not prove helpful as a guidance for conduct is not of the right kind. It is obvious that the head, the heart and the hand must always cooperate, and not any one of these three factors can be neglected with impunity. But even if mysticism remains antagonistic to scientific aspirations we still recognize in it a force which if it happens to tend in the right direction, may very well serve as a surrogate for truth it-

self and will be of great service to many—to all those who are incapable of thinking the truth with scientific exactness and must be taught in parables. It will allow them to "see as through a glass darkly," which is far better for them than to be entirely blind, and it will prepare them for the time when they shall see "face to face."

EDITOR.

MORAL STIGMATA OF DEGENERATION.[1]

A PERSON may have several physical stigmata or signs of degeneration and be at the same time endowed with moral and intellectual powers of the highest order. One may possess a healthy body and be a criminal by nature. A mental genius may be morally depraved. A high moral sense may coexist with mental mediocrity; indeed, it is not uncommon, but unfortunate to find goodness of heart combined with mental stupidity. There are very few persons without a stigma of degeneration.

In brief, mental, moral and physical defects and endowments may exist in individuals in most varied degrees and apparently independent of each other. Great injustice is therefore often done, by applying the term "degenerate" indiscriminately. In fact, some of the most ideal characters have been physical nonentities, or even physical degenerates of a pronounced type.

MEANING OF DEGENERATION.

In its anthropological sense, degeneration signifies departure from the primitive type, or reversion to a lower type, causing deterioration and loss of native faculties or race characteristics. Thus domestication has caused the degeneration of most of the primitive races.

For the naturalist, the most perfect type of horse is the Arab horse, the horse of nature and savagery. But

[1] Senate Document 87, 58th Congress, 3d Session.

from the agricultural point of view, the domesticated horse is superior.

Degeneration in a general sense, may be considered an essence, aptitude or tendency, which hinders development (mental, moral or physical) favorable to the species and tends toward diseases, which lead to dissolution of the species or offspring.

This essence, aptitude, tendency, disposition, or weakened power of resistance existing from birth until death, is degeneration.

This degenerative tendency may manifest itself by mental, moral and physical effects, signs, or stigmata, which may be the product of an original defective disposition, or the result of bad nutrition before or soon after birth.

These stigmata are either physical and so signs of intrauterine degeneration, or are mental and moral and can be signs of degeneration appearing in childhood, or later in life.

MORAL STIGMATA.

Moral stigmata of degeneration refer to the lowering of character and are much more injurious to society than mental or physical stigmata.

The popular idea of degeneration is a man of bad moral tendencies and habits, a profligate, spendthrift, gambler, drunkard, opium fiend, libertine, and the like. It is the moral defects of stigmata rather than the physical and mental, that the public mind emphasizes in designating an individual as degenerate. Moral degeneration consists in any evil thought, feeling, willing or action detrimental to individual or community which is a permanent element or tendency in the character of the person.

Such degeneracy, though it manifests itself only on occasions or periodically, exists from birth until death.

Moral degeneration, like physical or mental, may express itself in acts, which are its signs or stigmata.

FORMS OF MORAL STIGMATA.

Moral stigmata, in general, consist in anomalies of character, especially in infancy, as bad impulsions, violence, anger, strange vagaries of sensibility, refractory to all reform, and instinctively perverse acts, as theft, murder, brutality, coarseness, etc.

Evil tendencies, showing stigmata, may be awakened or developed by intoxicants, as alcohol, opium, hashish, cocaine, chloral and tobacco (cigarettes).

Acts in which there is permanent tendency, disposition or inclination to commit crime, constitute the most serious forms of moral stigmata. Such stigmata are: Crimes against person as, homicide, murder, assault, torture, robbery, rape, kidnapping, seduction, blackmail, etc. Crimes against property, as, burglary, arson, larceny, embezzlement, forgery, extortion, destroying property, etc. Crimes against chastity and decency, as incest, sodomy, exhibitionism, and other sexual perversions.

Any act is a moral stigma of degeneration in which there is a permanent tendency or inclination:

To indulge in any form of vice, dissoluteness, depravity, profligacy, vileness, or loathsomeness.

To use any form of deception, as lying, fraud, trickery, imposture, etc.

To any kind of meanness, villany, baseness, etc.

To extreme selfishness, self-love, egotism, stinginess, covetousness, etc.

To cowardice, poltroonery, extreme distrust or suspiciousness, etc.

To any form of cruelty, brutality, inhumanity, etc.

To any form of vulgarity, coarseness, etc.

To any form of malice, hatefulness, ill-will, revenge, etc.

To laziness, indolence, listlessness, dilatoriness, etc.

To ostentation, display, pomposity, vanity, or arrogance.

To frivolity, silliness, giddiness, etc.

To run into debt, insolvency, etc.

To wastefulness, extravagance, etc.

To uncleanliness, filthiness, etc.

DISEASED MORAL DEGENERATES.

Diseased moral degenerates are those with a disequilibrium of the sensibility and the emotions. They react with great energy from all causes, which affect the emotional side of their individuality. The modes of reaction are of two orders (1) depression and (2) excitation.

To depression belong cases of moral hypochondria, states of great perplexity, in which the person lives continually subject to the common causes of simple depression, as chagrin, reverse of fortune, etc.

Those who react by excitation, at the least solicitation are the prey of an erethism, which manifests great irritability, violent outbursts, and acts so brisk, that they seem irrational.

Moral insanity is a stigma of the most profound nature.

Certain degenerates seem unable to adapt themselves to the rules of morality; they know these requirements, but have no feeling responsive to them. Such degenerates are called morally insane. The degrees of moral insanity run from simple obscureness of insight to complete indifference or obtuseness to moral sense or feeling.

The bad instincts may exercise tyrannical influence, during life constituting a dangerous infirmity. Conscience may be very weak or nil.

SOCIOLOGICAL STIGMATA.

Sociological stigmata are fundamentally a form of moral stigmata, and are due to a permanent inadaptation

to surrounding conditions consisting in manifestations, or acts, that are detrimental to society. The want of adaptation, causing such acts, or stigmata may be:

Total or partial. In the total, the individual is lacking in so many elements of adaptability, that it is impossible for him to live in society.

Partial inadaptations may be racial, natural and individual.

A person of one race is often not adapted to live among people of another race. In the lack of family instinct, absence of love for children is a greater stigma than absence of love for parents, though both wound the most intimate feelings.

Social inadaptibility depends largely on the surroundings of the individual. A person may be living a quiet and inoffensive life, in complete harmony with his environment, when through some misfortune, everything is changed, and if unable to adapt himself to the new conditions, he succombs and becomes an enemy of society. If he has been living for a long time in harmony with his conditions, this very fact makes it more difficult to overcome new hardships and temptations.

RELATION BETWEEN DEGENERATION AND ECONOMIC SYSTEM.

Every human being should have sufficient food and clothing, a healthy habitation, opportunity to be clean, no requirement to work beyond his powers and freedom from excessive anxiety. Such surroundings would be simply normal. But it is doubtful if half of the population are so fortunate as to have such an environment. The more the individual is deprived of such normal conditions, the more he is liable to deteriorate mentally, morally and physically. The poor are badly and insufficiently nourished, which is due to ignorance as well as want of money. They

become feeble through mal-nutrition, are rendered more susceptible to disease. Thus women with rickets often have a narrow pelvis, which is a stigma of degeneration and can be the cause of injury to the child's head at birth.

The inability or unwillingness of many women to nurse their own children favors the development of degeneracy in their offspring. Such women place the pleasures of society above the duties of motherhood, which indicates extreme selfishness, a stigma of degeneration.

A degenerate, if possessed of means, can easily marry, but his children will probably be degenerates. On the other hand, many healthy and strong individuals are prevented from marriage, because of their very limited means.

Again, militarism takes the strong and destroys them by war, or returns them to society enfeebled and diseased. In the meantime those too weak or defective for military service have had opportunity to reproduce their like at home.

Many of the causes of degeneration in the poorer classes are not found among the well-to-do and wealthy. Yet the lazy and indolent ones are prone to indulge in all kinds of excesses, which can lead to degeneration.

In the strenuous life of the middle classes, where competition is at its maximum, there is constant strain on the nervous system and if misfortune threatens, fear pervades the mind continually. In the liberal professions also competition has become so great that the strain on the nerves not infrequently results in neurasthenia, which is chronic fatigue.

The authorities are almost unanimous in the opinion that alcoholism is a prolific cause of degeneration. The spread of syphilis by means of prostitution which in its turn is influenced by economic conditions, is one of the most insidious causes of degeneration.

ECONOMIC STIGMATA OF DEGENERATION.

The present economical system of the world, though it may be the best possible under the conditions, seems to tend towards a weakening of the social instincts. The spirit of domination and insensibility for the misfortunes and defects of others among the upper classes and the servility and jealousy of the lower classes create a state of unrest and disequilibrium which are mental stigmata of degeneration. This condition is unfortunately increased by the contrast on the one hand of luxury often accompanied with laziness or debauchery and, on the other hand, extreme poverty with its consequent misery.

The spirit of domination and insensibility over against servility and jealousy are economic stigmata of degeneration.

Poverty and the fear of poverty (often worse) are also stigmata of an economical order, and in weaklings especially, are the occasion or cause of innumerable social evils. Thus child labor increases, and with it a tainted morality due to its bad, if not unnatural conditions, hindering normal development and producing premature agedness in the young.

The parent has charge of the child's education. The public pays little or no attention to it. The consequence is that large numbers of children are brought up by wholly incompetent persons. For the children of the lowest classes, education is hardly possible, owing to lack of means and absence of both parents from the home.

Extreme poverty, moral abandonment and educational neglect of children in the lower classes and cupidity in the upper classes are economic stigmata, giving rise to much misery and crime.

CIVILIZATION AND NERVOUS EXHAUSTION.

Civilization, the development of science and industry, and the economic system are the result of adaptability to environment. Each new effort of adaptation, each advance of that which is called civilization, is a new cause of exhaustion, which always acts with more intensity upon the feeblest individuals, who soon become incapable of continuing the struggle and succumb either to general troubles of nutrition or to degenerative tendencies, manifested in different organic diseases or functional defects.

In this struggle for existence, especially in the cities, it is the central nervous system, which bears the greater burden of the work of adaptation. It should be remembered that exhaustion of the nervous system can come from physical as well as from mental strain. One of the main effects of such exhaustion is incapacity of sustained effort, a stigma of degeneration. It is true that those congenitally healthy usually recuperate from the exhaustion. But if there be added privations of all sorts, the exhaustion may become more profound and not only favor individual decay but bestow morbid aptitudes upon the generation which follows.

EVIL EFFECTS OF LONG HOURS OF LABOR.

Too long and too severe work to which the laboring classes are often forced bring on conditions, that tend to develope degeneration. For the nervous system is overstrained, causing a certain irritability, which later may give rise to an abiding weakness or languor, which can be accompanied with a dull headache or even inability to think clearly. If excessive work be continued a long while, soon the whole body will be involved, the heart and larger vessels will be injured; circulatory disturbances may appear, as swelling in different parts of the body, especially

in the feet, and also there may be vomiting of blood. The brain ceases to act normally, so-called cerebral symptoms appear, as dizziness, whizzing in the ears, deafness, defective sight, paralysis and apoplectic seizure. Likewise, liver, kidneys, and the digestive tract are involved in the general weakening process. The muscles also loose their strength.

Not only overwork but its monotony is a cause of physical and mental fatigue resulting in deterioration. The less variation in work, the more tiresome it is, as it requires only the use of the same muscles, while the other muscles, being unused, may become dwarfed. The effect upon the mind is still worse. The specialization in modern methods of production, which requires an individual to do one thing only, is extremely monotonous. Thus in the making of shoes, each man has one or two parts only to attend to, requiring the same muscular movement, which he repeats day after day. This also makes him unfit to do anything else. And to add to his misfortune, as soon as he begins to grow old he is very liable to be replaced by some younger man, and thus becomes helpless and dependent. To cast a faithful man out in this way, is wrong in the very nature of things. The ignoring of people simply because they are old, is the result of extreme selfishness, a moral stigma of degeneration.

The present economical system causes women and children to seek employment outside, which gives rise to conditions leading to degeneration.

Many women are obliged to work at trades ill adapted to their nature. The fear of losing their places and the impossibility of living without their wages cause many to work almost up to the last moment before giving birth to a child, and to resume work a very short time after confinement. This can produce very serious results both to mother and child.

CRIME AND MORAL DEGENERATION.

The moral degenerate often becomes a criminal. Unable to direct his mental operations, slave of his impulsions, or sentiments, which make him partially automatic and suggestible, it is easy to comprehend how he may, on the slightest temptation, be lead into crime.

Many criminals possess the marks of degeneration. No one has established this better than Lombroso and his school. Yet many degenerates are not criminals and probably would never commit a criminal act. Nor do all criminals have the stigmata of degeneration.

Criminals may be said to be inadapted to society. This want of adaptation may be permanent or temporary; in one case it is due to inward nature, in the other, to environment. But the lack of adaptation is a stigma of degeneration only when it is permanent.

The normal man has a certain capacity sufficient for the exigencies of life. This capacity is wanting in the criminal and the degenerate, and is also wanting in a more or less degree in children, aged persons and insane.

A man can be a moral degenerate and have a criminal nature, though he may not have committed any act which could be regarded as a sign or stigma of either. He may have had immoral or criminal tendencies in him, but a good home in early life and like surroundings later on may have saved him from falling.

Incapacity of sustained effort is one of the most common stigmata of degeneration. Degenerates therefore, in addition to the usual need of subsistence, have special wants for the relief of their decaying vitality. They are thus often forced to depend upon others as they are incapable of supporting themselves. They accomplish this by dishonesty or violence. Thus it is that degeneracy increases crime. The more an individual, or race, becomes

feeble, the more its need of stimulation or excitation, and each excitant only leaves it more exhausted still. The degenerate is attracted by the very things that injure him, which increase his degeneration and tend to eliminate him. The alcoholic, the gambler, and the libertine are similar examples only too well known.

DEGENERATES IN PRISON.

To gain an insight into the actual relation of degeneration to crime, there is perhaps no better way than to give the divisions of prison population with the classes and proportion of degenerates. As an illustration the prisons of Paris and suburbs may be taken. In these prisons, the inmates are of two classes, those who are fixed there and those who form a floating population, consisting of persons who may have been convicted once or twice but rarely more, like the wine merchant who is imprisoned for adulterating his product, or the bank clerk who at the time of great need borrows money from his case and forgets to return it.

These and similar criminals are only prison transients. Generally one or two days confinement are enough to make them more honest, or at least more careful.

Those who are permanent inhabitants of prison are often habitual criminals who have been convicted many times. These may be divided into two classes: The infirm, beggars, and vagabonds, persons incapable of earning a living and to whom prison is a refuge. They are seldom convicted of theft, but continually arrested for begging, or vagrancy. The second, or permanent class are the real criminals, those whom theft, vagabondage, drunkenness, rape and murder continually bring back to prison. These are degenerates.

If we eliminate the floating population of prisons, most

of those who remain are sons of alcoholics. Father alcoholic, son criminal and usually a thief.

The habitual criminal shows the influence of parental alcoholism, manifests absence more or less complete of moral sense and exhibits the influence of prison life.

The class of degenerates most frequent in prison are the weak-minded, then follow superior degenerates. The least numerous are the imbeciles.

The weak-minded are without intelligence and judgment, with narrow ideas and mechanical memory, with feeble will powers, incapable of attention, without imagination and giving passive obedience to the suggestions of others.

The superior degenerate is relatively rare in prison. He is without equilibrium, yet intelligent, but his mind acts in an unequal and sudden way. He may have generous ideas and high ideals, but he is incapable of sustained effort, and so unable to carry out his principles. His eccentricities suggest the need of an asylum rather than a prison; but being without equilibrium he may not know how to repress his passions and so commits crime.

In his youth the imbecile is most frequently placed in the asylum, but his mind being moved almost wholly by instinct and impulse and thus being liable to commit some offence , he may find his way to prison.

STIGMATA OF CRIME ACCORDING TO THE ITALIAN SCHOOL.

According to the Italian School of Criminology, the habitual criminal is a born criminal and presents certain physical and mental deviations from the normal man, that are characteristic. Some of the more important of these deviations or stigmata are: very small or very large head and a general lack of symmetry, as saddle-shaped head (clinocephalus), pointed or sugar-loaf head, a twisted

shape head (plagiocephaly); sometimes called kidney-shaped.

With the anomalies of the skull go naturally those of the face. As the bird face with the very small head, the flat forehead of the pointed head, a crooked and flat nose, prominent eyebrows and jaws, asymmetry of the orbits, slanting of the teeth, deformities of lips and gums, lower jaw projecting beyond the upper, and many irregularities in the shape of the ears.

Of the deviations or stigmata in the rest of the body might be mentioned excessive or dwarf growth, unequalness of both halves of the thorax, club-foot, club-hand and many anomalies of the genital organs. These are some of the main anatomical stigmata, claimed to be characteristic of habitual criminals.

Some of the functional irregularities or stigmata are: obtuseness of sensibility to pain (analgesia), incapacity of blushing, color-blindness, left-handedness and abnormal sexual impulses.

Mental anomalies consist in a weakened intelligence, or unequally developed. There is an obtuseness to or absence of kind feeling or altruism, a moral color-blindness, with an incapacity for repentence or for improvement, an inconstancy and changeableness in feeling, and from childhood up a permanent inclination to immorality and maliciousness.

It will be admitted that all of these stigmata are also stigmata of degeneration. But that they are characteristic or peculiar to habitual criminals, is disputed by the great majority of authorities and is therefore a question that can be left to the future.

ARTHUR MACDONALD.

WASHINGTON, D. C.

ERNST MACH, IN CONGRATULATION ON HIS SEVENTIETH BIRTHDAY.

AMONG our contemporary scientists there are few, if any, who have attained an importance which would equal that of Professor Mach, and we here take the liberty to congratulate him publicly upon his seventieth birthday, which he will celebrate on the 18th of February, 1908. Professor Mach is not only a man of distinction in his specialty: he has not only all the usual honors of the government heaped upon his head, for instance a membership in the house of lords of the Austrian empire, but he has also become known as a model in his personal attitude. Success and fame have not spoiled him. He has preserved an unaffected simplicity, we may say modesty, which is only found in truly great men, never in men of talent who excel rather by brilliancy than be thoroughness.

It has become customary to celebrate the seventieth birthday of famous men, but Professor Mach has stopped all these efforts, and has refused to accept delegations and similar honors that should officially be offered him by his friends and admirers. He knows that on such occasions people are sometimes forced into participation against their own wishes, and he would perfer to have recognition come when all personal motives and regards of a social kind have been taken away,—which would only be when a man has passed out of life. We hope, however, that Professor Mach will pardon us for following our natural impulse

not to let the anniversary of his seventieth birthday pass by without at least mentioning the fact and saying that we think of him in grateful recognition of his merits for science, especially physics and the history of mechanics, and the philosophical interpretation of scientific research. We can do this with the greater impartiality as in spite of the many points of contact that exist between Professor Mach's philosophical attitude and our own, we have differences which for all we see are in some of their inferences of signal importance.

We had discussions with Professor Mach, but never were we confronted with a scholar with whom dispute was carried on in such an impersonal spirit, by simply offering explanations of the topics in question, as in his case. In fact his personality disappeared in his work, which may fairly well be characterized as an absolutely objective consideration of facts.

At any rate he gave the first impetus to seek the unity of his branch of inquiry with kindred ones and with all the others, so as to keep in mind the oneness of all of them and produce a world-conception consistent in itself and founded on the facts of experience.

At the time when Professor Mach was a young man, science was not only alienated from philosophy, but the different sciences, too, developed separately in isolation. That conditions have changed is to no little extent due to Professor Mach, who was one of the very first naturalists who ventured beyond the boundary of his specialty, and proposed to comprehend its place in the economy of the whole. Thus he became a philosopher and we may call his philosophy "the philosophy of science."

EDITOR.

CRITICISMS AND DISCUSSIONS.

THE MYTHOLOGICAL HEBREW TERMS EXPLAINED BY THE SANSKRIT.

An Essay in Comparative Philology and Mythology.

[Mr. O. Neufchotz de Jassy's article presents a very original and novel theory, the derivation of Israelitish notions and names from Sanskrit sources. If it be true, it would open a new vista to comparative religion and folklore, but if it be a mere ingenious conceit, it remains none the less interesting and will even prove instructive because it teaches us how many purely haphazard coincidences can be discovered if we only seek zealously for them, being permitted to adjust them ever so little to make them suit the occasion. What remarkable combinations can be found in the Cabbala, and other mystic books!

We do not deem it likely that Hebrew scholars will readily take to M. de Jassy's theory, but they will be astonished to note how easily, for instance, the plural form *Elohim* which has given so much trouble to Biblical exegetes can be changed into a veritable singular without changing a letter in the text, simply by a modification of the vowels, superadded to the text by later generations. And what a remarkable coincidence, if such it be, is the fact that the name Noah (in Hebrew *Nowah*) might very well according to its sound be a derivative from the same Aryan root from which sprang the words *nauta*, sailor, *navis*, ship, *navigare*, to sail, etc.!

The three consonants N V K correspond exactly to the root of *navigare*, N V G, and it would not be impossible that the Persians, who are an Aryan people, called the Babylonian Parnapishtim, the hero of the Babylonian Deluge legend, in their own language "the seafaring one," and that the Jews adopted that name. At any rate we may concede that the word Noah is not Hebrew and its derivation from the Hebrew *noakh*,* "rest," is not tenable.

We can not say that we have become convinced by M. de Jassy, but we trust that our readers will be as interested as we have been, in noting these many surprising coincidences.—Ed.]

I propose to show in this essay that almost every mythological Hebrew term in Genesis finds a similar term in the mythology of the Hindus, and that the similarity of the terms has as corollary an

* נוֹחַ

absolute concordance of the myths. I will show further that most of the Hebrew terms even of less importance are derived from Sanskrit roots and that there is without doubt a narrow relationship between the Sanskrit and the Hebrew languages.

The results of this essay may be a copious harvest of surprises. Many terms whose explanation has been more or less doubtful will find a definite solution, other terms will show that they conflict obviously with the primitive significations scholars have given to them. The whole mythological web and woof may change in its intrinsic form, and people will be surprised to suddenly find the reconstruction of the mythology of the Hebrews, accidentally lost or intentionally destroyed.

It may be that scholars will hesitate to follow us in the new orientation given to the methods of explaining words and myths *per analogiam*—especially those scholars whose theological convictions harmonize with their scientific conceptions; but by deeper examination of scientific facts and the result that necessarily follows, they cannot but consider very curious these numerous coincidences.

Let us take one or two examples:

The word *Shadai* or *Shaddai* is translated by all scholars "the almighty," and *El shadai*,[1] "the almighty God." Our method *per analogiam* will show that this translation is absolutely false. More than that, it will show that the similarity of the Sanskrit and the Hebrew words reveals a mythological fact that was unknown until the present time.

Let us see for instance whence *Shadai* is derived. It comes from the verb *shadod*,[2] "to destroy."

Shadai, then, means "destroyer" and *El shadai*, "the God of destruction."

Let us now investigate the root of the verb *shadod*, which is *shad*. What does *shad* mean in Sanskrit? To subdue, to vanquish, to destroy. Hence the root is the same. Let us now see what *shadia* means in Sanskrit. It means "the destroyer" and is an epithet of Shiva. *El shadai* is therefore *Shiva-Shadia*. Is this a coincidence? Let us go further, let us follow it to its last consequences. Let us see how the worshipers of *Shiva* adored Shiva, and how the worshipers of *El-Shadai* adored El-Shadai. This comparison will be the more interesting because it has never before been undertaken.

[1] אל שדי [2] שדד

The worshipers of the Hindu *Shadai,* of Shiva, put on their left arm a little receptacle or a ring containing the united *linga* and *yoni.* We do not need to observe that Shiva represents both lust and destruction, or destruction and *re*construction.

The Jews have the same custom even in our time. They put on the left arm a little black box (*Shadai* or *Shiva* represents the dark color, the night). On two sides of this receptacle the letter *sheen*,[3] representing the word Shadai, is embossed. It is presumable that this little box, called *baith,* "the house," contained originally the same priapic emblems replaced later by the Talmudists with a few texts taken from the Bible. The Talmudic rabbis changed even the name of these boxes[4] called formerly *Totuphath* (the etymology is unknown) to *Tephilim* (Greek, philacteries), "prayer-boxes."

It is needless to add that the Jews were worshipers of the phallic cult, that the covenant between El-Shadai and Abraham is a phallic one etc. We will only observe that the phallic worship comes from the Hindus and that Shiva especially was narrowly and brutally connected with this worship.

So inveterate was this cult of Shadai-Shiva with the Jews that neither the efforts of the Jehovists nor time itself could destroy it. Even to-day on the doors of every orthodox Jew may be seen a little cylindrical box of glass or metal bearing the name Shadai, and the women in childbed are surrounded by little papers bearing the name of Shadai. Certainly the signification is lost, like the signification of the fish that Catholics eat on Friday, like so many religious or superstitious significations.

It there also a strange coincidence in the similarity of the worship?

Let us now take an example of less importance, the word *Misraïm,*[5] Egypt. Let us remove the plural ending or rather the dual form *aïm.* We obtain the word *Misr.* Let us now see what *misr* means in Sanskrit.[6] *Misr,* from *misra,* signifies "combined, united, jointed places." *Misr* in Sanskrit means Egypt (the upper and the lower, hence the dual form in Hebrew). It would be idle to continue here.

[3] ש

[4] There are two, one for the forehead and one for the arm. The worshipers of Vishnu also put a kind of trident called the *Nachman* on their foreheads.

[5] מצרים

[6] See M. Monier Williams, *A Sanskrit Dictionary.*

Before I go further I would observe that this essay contains nothing but a few outlines of an important work in preparation that requires time, patience and depth of research.

Elohim.

The first mythological surprise arising from a study of comparative philology and mythology meets us in the well-known triade: *Bereshith bara Elohim*[7]: "In the beginning *the Gods* created."

These three words in the beginning of Genesis, have always been the stumbling-block of Jewish and Christian scholars. Why is Elohim in the plural, and why is the verb in the singular?—The most fantastic comments were given to this grammatical anomaly. Petrus Lombardus went so far as to try to prove the trinity in this—*pluralis majestatis,* and Rudolph Stier invented for this purpose a new grammatical term the *pluralis trinitatis.*—The most subtle comments were given and the most ingenious. However, scholars were mistaken; the ground for their mistake lies in the fact that they reasoned with casuistry rather than scientifically.

From the standpoint of comparative mythology, we do not see in any other theogony a similar conventional plural form, though the highest gods of the Hindus, Egyptians, Babylonians, Assyrians, Greeks and Romans represent a plurality of the most various epithets. Savitri is Praja-Pati, is Indra, Rudra, Agni, Soma, Vishnu etc. The Babylonian Marduk possesses fifty names of the great gods that had been conferred upon him; he is Bel and Ea and Anu and Nebo, Enlil and Nergal etc. Nevertheless they ignore this *pluralis majestatis* of the noun agreeing with a verb in the singular form. Zeus, Jupiter, Osiris etc. possess the same richness of divine epithets, and the Greeks especially were certainly a people of refined and high courtesy in regard to their gods. When we see a disagreement between the divine noun and the verb, it is rather in the singular of the first and the plural of the latter. And this fact happens in Genesis only when Elohim—who, we will see immediately, is not Elo*him* at all—is speaking to himself, takes council with himself. "Let us make a man in our image."[8] But in the narrative the singular of the verb is always used.

No, this *pluralis majestatis* of Elohim is not to be taken seriously.

Another more important question arises which, as we will see, is in close connection with the first.

בראשית ברא אלהים [7] נעשה אדם בצלמינו [8]

How is it possible that whereas all other cosmogonies begin with the creation of the gods, the Bible alone shows us a *Deus ex machina*, ready made, without indicating how he was created or of what matter he was formed?

As we said both questions are closely connected. Both are included in the same word, and the double explanation will be found in the etymology of *Elohim* itself. It will show us for instance that the plural form of *Elohim* is *not a plural at all*; it will show us further *how the God of Genesis was created* before he became creator in his turn.

Elohim is composed of two words,[9] and the explanation lies in their separation. *El* being now in the singular form, the verb *bara*, "created," agrees with the noun in the most natural way. *El bara*, "El created." This is the first solution.

The other is most interesting, although it seems more complicated in its exposition and final deductions.

El haiom, the Seagod.

El being *El haiom*, the Seagod, the God *who started from the water*, we discover to our surprise the most interesting mythological phenomenon, viz., that the same fate that governs the gods of all the theogonies, governs also the Hebrew El.

In all the cosmogonies the first factor of creation starts from water. Water is the origin of the universe. The earth originates from water, and as we will see *El* means "earth." The heaven itself is nothing else but water as the word *shamaim* indicates and as we will see later. All creatures, beasts and birds, formed by *El haiom*, are made of water (see Genesis).

The scribe of the Bible is guilty of this little fault of contraction that concealed during centuries how the God of Genesis was created and the Masoretic doctors—perhaps Ezra before them—impregnated with Jehovistic ideas, did nothing toward revealing the mistake—rather did everything to hide it,—and they voweled the contracted words with the point-vowels *Elohim*, which thus became a plural form.

El from the Standpoint of Comparative Philology and Mythology.

But let us examine thoroughly the two words from the standpoint of comparative philology and mythology.

Hebrew, *El*; Sanskrit, *il*; Babyl. *Elu*; Phœnic. *ila*; Arab. *ilah, allah*; Greek, ἥλιος; Lat. *Sol*.

[9] אלהים = אל הים

El then means earth and is to the Hebrews as Elu is to the Babylonians, Helios to the Greeks, and Sol to the Romans, at first a *terrestrial god par excellence*. And as Elu becomes a heavenly god, as Helios becomes a heavenly god representing the Sun, as Sol becomes a heavenly god on the same condition as Helios, El will become a heavenly god, as we will see later, though he will remain the terrestrial god, occupied with the general affairs of mankind like the other gods, at least those who started from the waters and who became friends, teachers and saviours of mankind. This fact brings El in near connection with the corresponding gods of the other nations as will be seen when we shall have studied his apposition *iam*.

Iam, יַם. *Mai*, מַי. *Maia*.

Iam in Hebrew means "sea," (*ha* is the article). The inversion of *iam* is *mai*, Assyr. *mei*, "water." The corresponding term in Sanskrit is *maia*.

The mythological result obtained from the philological analogy of *Mai* and *Maia* is as conclusive as it is interesting.

Maia is the water and the mother of Brahma (earth, at first a demiurgus like El). Mai, the inversion of *iam*, is the water and the mother of El. El is therefore identical with Brahma as he is identical with Elu, Helios, Sol.

Every divine being with the Hindus has his Maia. Every divine being in the theogonies of the other nations has his Maia. Moses has his *Mar-jam* (the "drop of the sea," i. e., the water). Christ has his Maia (Latin *mare, maris*, whence *Mari-a*, the *a* forming the feminine). The mother of Bacchus, the saviour of mankind, was Myrrha or Maia. The mother of Hermes, Krishna, Buddha, Adonis etc., was called Myrrha or Maia; Maia, Maria (a pleonasm form of Maia) was also called the mother of the Siamese Savior, Samona Cadona.

Mai or Maia represents here as there the productive power of the female principle. The first factor born of it is the male, who becomes creator in his turn. Every saviour of mankind is therefore a *firstborn*. He is also a *virgin*-born, because Maya, the mother, produced him without fecondation by the male principle. But the male principle of fecundation in nature being the *sun*, or the fire representing the sun, all *Earthgods* will represent the sun: El, Brahma, Elu, Helios, Sol, etc. The most characteristic illustration of the fire residing in the water as the lightning resides in the

clouds, gives us the Vedic sacrifice whence the Christian communion is borrowed. Both offerings, the sacred liquor Soma and the cake prepared of butter and flower, are presented to the holy fire. Agni (the fire-god) resides in both. The chalice contains also the mother of Agni, Maia, because Maia, the flame, can start from Maia, the liquor.

Iom, Ioni.

We have seen that Mai or Maia are identical terms with identical significations and represent similar mythical personifications. The root of the words *Iom* (*Yama, Yamuni*) will show us other mythical similarities with *El-ha-iom*, which will appear to be new personalities, but which are really the same as the deities already mentioned. The root of *iom* is the Sanskrit *yu*, the same as of the term *Yoni*.

Iom and *Ioni* having the same root, have also the same signification. *Yoni* or *Yonis* means the womb, the matrix, the life-giving element, the water. Although representing the female organ of generation, both *iom* and *yoni* are of a masculine form. It is true that the later Sanskrit uses *Yoni* as both masculine and feminine. But *Yoni* is rarely feminine in the older language. *Iom* in Hebrew is always masculine: *Iom hagadol* etc.

This curious linguistic phenomenon showing the words *yoni* and *iom*, which are representing the female organ, in a masculine form, is observed also with the word *mata*, mother, that is masculine in Rig-Veda. More than that, in the Georgian language *mama* signifies *father*.

The reason of this strange phenomenon may be found in the fact that these words were created in a matriarchal epoch, when the mother, having the entire care of her children, who often ignored their father, represented the acting personality, the nourisher and defender, the strength, the male, the father.

The life-giving *Yom* or *Yoni*, the nurses of all living creatures, are in the same case. *El-ha-iom* and *El-yoni* will then have the same signification. He is the fire or the sun residing in the *iom* or Ioni and starting out as creator and saviour of mankind. He is therefore identical with *Jonas* (Jonah), with *Oannes*, with *Okeanos*, who are the same mythological personifications [derived from the same word *yu* or *Yoni*] and with all the *Jona* that we will find later with the most diverse nations. I would state here that the etymology of all these words was unknown until the present day.

El-ha-iom and the Sea-Deities.

I do not know whether the beginning of Genesis describing the creation of *El-ha-iom* and his other peculiarities is lost, or if the theogonic part is written intentionally in condensed terms for the reason that the Jehovists wished to conceal a mythological fact that seemed to conflict with their new theological ideas. The exterior form of El, his personality, is not depicted as that of the other sea-gods whom he resembles in his essence.. Indeed every sea-god we enumerated bears a peculiarity that is characteristic of an aquatic being, as he bears in his love for mankind a characteristic of mankind. The head is generally that of a man and the body and the tail those of a fish.

It is natural that the *Iom* or the *Joni* being the liquor and the fire residing in the liquor [El and Iom, Agni and Maya, Helios and Thetis, etc.] the fish will represent the watering element and the fire. Hence in all the cosmogonies the fish will represent the sun and all the sungods will be in their own turn represented by the fish. Indeed, we see all the saviours appearing in the form of a fish. Vishnu became a fish to save the seventh Manu, the progenitor of the human race from the universal deluge.

The Assyrians and Babylonians worshiped the fish Dagan representing the sun. The Talmud announced the Saviour under the form of a fish. The earliest symbol of Christ was a fish, and he himself is called a fish. Buddha is called *Dag-Po* or *Fo*, the Fish. Jonah, lying for three days in the body of a fish represents the winter solstice (from the 22d to the 25th of December) when the sun is in the lowest regions. But in Jonah and the fish the same mythical personification is divided into two, and such divisions are frequent in all theogonies. They represent the various manifestations of the same natural phenomenon.—The fact that neither *El haiom* nor Jonah nor Noah appears under the form characterizing the Chaldæan or Greek sea-gods, as for instance Oannes or Okeanos, brings the Jewish myth nearer to the Aryan source. Indeed, I do not doubt for a moment that the myth of Noah was at first borrowed from the Aryans, and that much later the Hebrews took a second graft of the same account from the Chaldæans. No doubt, there are two variations of the same deluge-story in Genesis. Hence the numerous contradictions. Struck with wonder by the similarity of the Biblical and Chaldæan myth discovered in the cuneiform inscriptions, Prof. Friedrich Delitzsch did not push his investigations

to the last etymological and linguistic consequences. And the names of Noah and his sons Cham, Shem and Japhet seem to me as important as the deluge story itself.

Noah or Novach and Agni-Novich.

As far as I know neither the meaning nor the etymology of the word Noah and that of the names of his sons have found a conclusive or even plausible solution up to the present day. The general acceptation that Noah means "who reposes" is not admissible and conflicts obviously with the high mission with which Noah was invested.[10]

The true significance of the word may be found in the corresponding Sanskrit term. The identical Sanskrit term for *Noah* or *Novach*—the name read without the masoretic point-vowels—is *Navaja* or *Navika*. Now let us see where *Nava-ja* or *Navi-ka* are derived from.

Nau or *nava* in Sanskrit means a ship, a boat, a vessel[11]; Greek ναῦς; Latin *navis*; old German *nach*; modern German *Nachen*; Anglo-Saxon, *naco*; Bav. *naue*.

Noah or *Novach* or the Sanskrit *Novich* or *Nava-ja* mean therefore the steerer of a boat, the pilot, Greek ναῦ-τη-ς; Latin *nau-t-a*.

The etymology of the word Noah appears so natural and so simple that we are indeed surprised that no linguist has made the application before.

But let us return to the myth.

One of the epithets of Agni is *Agni-Novich*, "Agni the pilot." But Agni is Vishnu and we saw Vishnu in the form of a fish saving the seventh Manu from the deluge. Now who is the seventh Manu? Another form of the first Manu, born from the sun, hence representing the sun. Who is Noah? Another form of Adam, the first man. When we open the book of Enoch we find this wonderful story about Noah's birth: Lamech's[12] wife brought forth a child, the flesh of which was white as snow and red as a rose, the hair of whose head was white like wool and long (all the solar gods have long hair, Samson, Phœbus, Hercules etc.) and whose eyes were beautiful.

[10] Some scholars translate Noah "the consoler." They see the consolation in the wine.

[11] The ark of Noah is called in Hebrew *teba*, without the masoretic points *tba* or rather *twa*, the *b* being soft without *dagash*; Sanskrit *twac* from the verb *twac*, "to cover"; Latin *tego*; Old German *dekin*; modern German *decken*; Lith., *denjin*, a bark, a peeling, a protecting cover. Bunsen derives *tewa* from the Egyptian *tba*, a chest; *tpt*, a boat.

[12] *Lamech*, Sanskrit *Lamash*, "the bull," the emblem of the sun.

When he opened them they "illuminated all the house like the sun," and when he was taken from the hand of the midwife, opening also his mouth, "he spoke to the Lord of righteousness," etc. We know that all the saviours of mankind spoke immediately after their birth. We know also that the fire is considered by the Hindus as the first ancestor of mankind. There is no mistake: Noah, Manu and Agni-Novich are the same mythical personification. They are the fire or the sun residing in the water. The deluge may overwhelm the whole universe, but Noah, the sun-pilot, starts triumphantly from the waters. This allegorical solar boat-steerer has the same *raison d'être* in the Bible as in the Vedas, since the Biblical heaven was made of water like the Vedic heaven—as we will see later—and the sun starting in the morning from the waters under the firmament, piles the whole day in the waters above the firmament.

Noah is the eternal solar pilot.

When we pursue our mythical investigation, we find in the compound word *nava-bandano* (ship-binding) the name of the highest peak of the Himalayas (the Mt. Ararat of the Hebrews) to which Manu is said to have anchored his ship in the great flood.[13]

Shem, Cham, Japhet—Soma, Kam, Pra-Japati.

The analogy of the linguistic and mythological facts becomes more evident, when we consider the sons of Noah, *Shem, Cham, Japhet.*

These three sons, it is said in Genesis, became the progenitors of the new mankind. Now let us compare them with the Aryan progenitors Soma, Kam or Kama and Pra-Japati (corresponding to the Babylonian Zorovanus, Titan and Japethostes) the three sons of the Hindu ark-preserved Manu.

[13] The Hindu legend of the deluge is as follows: Many ages after the creation of the world Brahma resolved to destroy it with a deluge on account of the wickedness of the people. There lived at that time a pious man, Satyvrata, (*Saty-vrata* is not a proper name, but an epithet meaning *pious man.* Noah also was named a pious man) and as the lord of the universe loved this pious man and wished to preserve him from the sea of destruction which was to appear on account of the depravity of the age, he appeared before him in the form of Vishnu and said: In seven days from the present time the worlds will be plunged in an ocean of death, but in the midst of the destroying waves a large vessel, sent by me for thy use, shall stand before thee. Then shalt thou take all medicinal herbs, all the variety of foods, and accompanied by seven saints, surrounded by pairs of all animals, thou shalt enter the spacious ark, and continue in it secure from the flood on one immense ocean without light, except the radiance of thy holy companions. When the ship shall be agitated by an impetuous wind, thou shalt fasten it with a large sea-serpent on my horn; for I will be near to thee (in the form of a fish; Vishnu-Noah-Jonah) drawing the vessel with thee and thy attendants. I will remain on the ocean until a night of *Brahma* shall be completely ended. Etc.

Kam or *Kama,* in Sanskrit, means: "he who follows the dictates of passion or desire." Kama is the god of love, Hebrew *Cham,*[14] "hot," substantive "heat, ardor." He represents the necessary heat for fecundation and generation, that is for Soma and Pra-Japati.

Soma represents the sacred liquor (of libation and fecundation) and the god himself. *Soma* means "to distil, to extract, to sprinkle, to generate," the act of pressing out the Soma juice being compared to the act of begetting. (Surā, the sun, represents also the spirituous liquor.) Soma is therefore the life-giving god, the generator of mankind as Shem is said to be.

Pra-Japati, lord of creatures, was an epithet originally applied to Savitri, Soma, Indra and Agni (all these gods represent the fire or the sun and are therefore generators), afterwards he became the name of a separate god presiding over procreation. Pra-Japati is Japhet.

Noah himself is said to have been a wine-grower. In a moment of drunkenness he uncovers his body. The nakedness of his father amuses Cham and he calls his brothers to see it. Noah curses Cham and makes him a servant of Shem and Japhet. This malediction has a natural significance. Love is the slave of passion and desire. Cham is the natural servant of Shem and Japhet.

Like Soma in the Vedas, so Shem is the most important of Noah's three sons. The blessing of Noah cannot be understood in any other way than this.

"Blessed be the Lord, the *God of Shem*;

"And let Canaan be his servant.

"God enlarge Japhet and let him in the tents of Shem,

"And let Canaan be his servant."

Canaan (*Kamama*) "the libidinous, the lustful," is the eternal servant of the drunkenness of the senses, of passion and desire, of Soma, and of the final act of procreation, of Prajapati who as we saw is an epithet of Soma.

"Let Japhet in the tenth of Shem" signifies "let Soma be Prajapati," "let the sacred liquor of generation end in fecundation.

A hymn in the Rig-Veda, which is addressed to Soma, says:

> "Where there is happiness and delight,
> Where joy and pleasure reside,
> Where *the desire of our desires is attained,*
> There make us immortal."

[14] חם

And another more significant hymn says:

"Thou Soma, guardian of our bodies,
Makest thy dwelling in each member.
Lord of heaven! Though we transgress
Thy firm decree so often, be merciful
To us and kind and gracious."

"Soma, guardian of our bodies, dwelling in each member," is this not Shem who with his brother Pra-Japati is the guardian of the body of Noah whose nudity is mocked by the frivolous Cham, the libidinous god of love?

This mythical allegory of the natural and productive forces in action is, at least, nothing but a repetition of the first cosmogony of Genesis. Noah is *El-ha-iom*. Both started from the sea and both became progenitors of mankind. Like Noah, El curses his creatures, the serpent, Adam and Eve, who are three different forms of the same mythical personality like, at least, Cham is Shem and Japhet,—they also were cursed bécause of their act of generation. They were ashamed to be naked after they had eaten from the tree of knowledge, like Noah was ashamed to be naked after he had drunk the juice of the grape (of Soma, the sacred liquor of knowledge, because knowledge in Genesis is the act of procreation[15]). The *serpent* is like Cham (*Kama*) the stimulation, that awakens sexual desire; *Eve* (HWH, *Hava* written *hve,* any feminine or coquettish gesture tending to excite amorous sensations) for the purpose of procreation, *Adam*. This libidinous serpent becomes the slave of Eve and Adam, like Cham became the servant of Shem and Japhet. In all the mythologies the gods are jealous of the holy fire residing in the sacred liquor that gives to mankind the knowledge of creation. El-ha-iom forbids Adam to eat from the tree of knowledge and punishes him for going beyond his prohibition, like Jupiter who refuses the fire to mankind, punishes Prometheus for having stolen it for mankind. But when the myth of Noah comes directly from Aryan source[16] and is later adulterated with the Chaldæan story of the deluge, the myth of Jonah, although having its root in Sanskrit, as we showed in another place, seems to be borrowed directly from the Chaldæan Oannes, which in turn was taken

[15] There is no mistake, רעת is knowledge *only* in the sense of procreation.
וידע אדם את חוה אשתו ותהר ותלד בן
"And Adam *knew* his wife Eve and she was pregnant and etc."

[16] The ancient temples of Hindostan contain representations of Vishnu sustaining the earth while overwhelmed by the waters of the deluge. *A rainbow is seen on the surface of the subsiding waters.*

from the Greek Okeanos (*aca* or *aka* and *yoni*) inversion of *Yan-aka*, the ocean.

Oannes, Okeanos, El-yoni, etc.

Berosus and Alexander Polyhistor ascribe the *event of the creation* to the teaching of an amphibious monster called *Oannes*. His body consisted of the body of a man terminating in the tail of a fish. By day he ascended from the waters of the Erythean Sea and conveyed his instructions to the assembled multitude in a human voice, but at night he returned from the land and concealed himself within the recesses of the ocean.[17]

Berosus, no doubt, who according to his own report lived at the time of Alexander the Great, borrowed the name Oannes from the Greek Okeanos, whose etymology and Sanskrit origin we showed above. It is the more easy to affirm this fact as Berosus uses *thalatta* for *Tiamat*, and *thalatta* is the Greek θάλασσα, meaning water.

As we see all these seagods are the same; they are all teachers of mankind. Jonah goes to Niniveh to preach, Oannes comes from the sea to teach. El-ha-iom also is a teacher. He teaches Adam what fruits he ought to eat, plant a garden for him, makes him clothes, and so forth.

El-ha-iom, no doubt, is El-yoni, is Aka-yoni (Okeanos), is Jonah, is Noah, is Oannes, is the Yona of the Gauls, the Jowna or Jona of the Basques, the John of the Scandinavians, the old Yona of the Trojans, the Yawna of the Parsis.

All these peoples worshiped the sun under the name of Jona ("born from the water"). Jona is the earth, the fish, the sun, the first-born, the god started from the waters. He is the Biblical seagod, he is El-ha-iom voweled in the Bible either erroniously or intentionally as Elohim and used as a plural without any plausible reason.

O. NEUFCHOTZ DE JASSY.

RIVERSIDE, ILL.

EDITORIAL POSTSCRIPT.

While making up the present number of *The Monist* we are in receipt of a second instalment from M. de Jassy, which is to corroborate his theory and adds more material of the same kind. Not

[17] G. Smith, *The Chaldean Account of Genesis.*

being able to publish it here, we will at least summarize the ideas which it contains.

As to the beginning of Genesis, M. de Jassy is inclined to admit with Moses Gerundinus (Nachmonides) called by the Jews "the pious teacher," that the words

בְּרֵאשִׁית בָּרָא אֱלֹהִים אֵת הַשָּׁמַיִם וְאֵת הָאָרֶץ׃

i. e., "In the beginning God created heaven and earth," may mean "In the beginning El-haiom created himself with heaven and earth."

The word *bara* is connected with the Sanskrit *bhara,* "to create," the root of which, *bhri,* reappears in the English verb *bear,* the German *gebären,* etc. The Sanskrit word *Bharu* means Lord, husband, in the sense of procreator, as the Hebrew *boreh* is used of Jehovah.

The word *rakia*[1] is referred to the Sanskrit *rakyia* or *raka,* a flash of lightning, azure, crystal, firmament.

M. de Jassy believes that the Old Testament teaches a trinity like the Brahman Trimurti, which he means to prove by the three covenants. The first covenant is made by Elohim, or rather El-haiom, the god of the waters, and is symbolized by the rainbow. The second is the covenant of the burning bush which Ehjeh[2] makes with Moses. The name Ehjeh, according to the current view, is the Hebrew word substituted for the four holy consonants of the ineffable name Yahveh.[3] The sentence in Ex. iii. 14, "*ehyeh asher ehyeh,*" is translated in our English Bible by "I am that I am," implying that the name Yahveh is derived from *hajah,* "to be." M. De Jassy discovers in *ehyeh* the Sanskrit *Ejeh,* which is "the fallen dawn," and he explains it as the fire that comes down from heaven, viz., lightning. The third covenant is made between El Shaddai and Abraham, El Shaddai being the destroyer who promises to preserve his protegé Abraham on the condition of circumcision which is a partial mutilation. The word *mula*[4] (circumcision) is supposed to be connected with the Sanskrit *mulya,* "to eradicate."

The passage (Deut. vi. 4),

שְׁמַע יִשְׂרָאֵל יְהוָה אֱלֹהֵינוּ יְהוָה אֶחָד׃

Hear O Israel: the Lord our God is one Lord,"

receives a peculiar interpretation. M. de Jassy denies that it contains any monotheistic idea, the word *echad*[5] meaning not only "one"

[1] רָקִיעַ [2] אהיה [3] יהוה [4] מוּלָה [5] אֶחָד

but also "the first." The passage therefore may be translated, "Hear O Israel, Yahveh our God is the *first* one [the first in the trinity]." On the other hand M. de Jassy is inclined to see in *achad* (i. e., *echad*) a similarity with the Sanskrit *arhat*, which is commonly translated "holy," or with *ahata*, meaning "unsoiled" or "uninjured."

The phylacteries (in the Talmud called *tephilin*[6]) which even to-day the Jews tie to their foreheads and arms are little cases inscribed with the letter *S*[7] and containing scrolls. The name *phylactery* indicates that they were for talismanic use, while the word *tephilin*, "prayers," shows the nature of the writing and the method by which the protection was accomplished. Now M. de Jassy claims that these cases, originally called *totophath*,[8] can only have been Shivaistic emblems of a phallic nature. The letter *S* is the initial of Shaddai or Shiva, and the word *totophath* is identified with the Sanskrit *tattva*, which means "real thing."

* * *

In reply to the editorial introduction to his article M. de Jassy makes the following rejoinder:

M. de Jassy's Rejoinder.

The theory of mere "remarkable coincidences," as the editor of *The Monist* denominated our demonstration at first sight, will, we are afraid, prove a failure. We are proceeding by linguistic proofs, and our mythological comparisons are geometrical congruences. If objections are made—we do not fear them—they have to be made in the same way and under the same conditions. Science excludes casuistical conjectures and the old theological standpoint is out of date.

Mr. Carus claims that Kabbalism has found many wonderful "coincidences" in cipher-combinations!—That may be! But "combinations" and "conjectures" are not scientific proofs. That the word *echad* (one) for example, gives the number 13 as the result of cipher addition of its three letters

א = 1
ח = 8
ד = 4
—
13

is a proof neither that this number is a holy one, nor that it denotes the trinity in the unity in the separation of the two digits 1

[6] תְּפִלִּין [7] ס [8] טוֹטָפוֹת

and 3. The same thing is true of the further result of the letters of Yahveh that give the number 26, i. e., twice the number 13.

י = 10
ה = 5
ו = 6
ה = 5
26

There is no plausible proof that Jehovah represents *twice* the trinity in the unity and that *Jehovah Echad*, together expressing in the *Shemah* the Jewish monotheism, represent as an emphasis *three* times trinity in unity.

When you continue in this way, the word *El*, "God," represents *three* in *one* as well:

א = 1
ל = 30
31

and when you take the word *lo*,[9] i. e. "not," the inversion of *El*,[10] you arrive at the same cipher result:

ל = 30
א = 1
31

But *lo* means "not" and *El* means "God." In this case God would be nought. Such demonstrations are absurd!

These number-plays borrowed by the Jews from the Chaldæans, who in their turn took them from the Persians and Hindus, may amuse the childish minds of unscientific casuists. In such combinations and conjectures "coincidences" may find their application; but modern philology and comparative mythology are based upon other foundations.

When I am able to prove that the root *R* is the same as the root *R'*, as it was shown, for instance, in *shad* (the Hebrew root) and *shad* (the Sanskrit root); when I can prove that the term *T* is equal to the term *T'* as I showed in *Shadai* (the Hebrew word) and *Shad-ja* (the Sanskrit word) when, finally, I can prove that the mythological facts which characterize the personalities represented by these roots and terms are as identical as two geometrical triangles, it is no longer lawful to speak of "coincidences"; or when you

[9] לֹא [10] אֵל

are speaking of coincidences, I accept them in their literal sense. These roots coincide, these terms and mythological facts coincide, because being the same, *they cannot but coincide*. Their point of departure, the idea they imply, the phenomena that accompany them, are identical, and they are based upon the same scientific principles. Only in this way can I accept for my thesis the word "coincidences." *Alterum non datur.*

A PRAGMATIC ZOOLOGIST.*

Andrea Giardina, in his recent work *Le discipline zoologiche e la scienza generale delle forme organizzate*,† takes occasion, apropos of certain criticisms previously made by him regarding the regulation of biological studies in our universities, to expound certain of his ideas on the methodology of the various departments of biology.

One of his main criticisms concerns the persistence of the distinction made between the teaching of zoology and that of comparative anatomy: a distinction which seems to him unjustifiable on any count, theoretical or practical, and to be explained only on historical grounds.

"To within a century the term 'zoology' applied exclusively to the study of the external forms of animals, and the best zoologists bent all their efforts to a careful investigation of the resemblances and differences of these outward forms; and zoology, outside of its bearings on the life and habits of animals, was a kind of comparative morphology confined wholly or largely to the exterior aspect of such organisms. Its main purpose was to elaborate a system of classification for animals which should be as simple as possible. The study of the internal organization, at first limited to man and those animals nearest related to him, arose chiefly as a result of the needs of medical science and did not attain so early to the rank of comparative morphology. The anatomists and naturalists who turned their attention to the dissection of the lower animals were few, and began perforce with the study of isolated forms. Anatomical monographs were not, and are not, things lightly to be dashed off: they took much time and labor; so that it was only gradually that there was amassed a body of material comparable in richness and variety with what was already possessed by zoology for external

*Translated from the Italian by Herbert D. Austin. This paper appeared originally in the *Leonardo*, Oct.-Dec., 1906.

† Pavia, 1906.

forms. But as the material became more considerable the natural instinct of comparison soon applied itself to anatomical data, and upon the basis of zootomy there began to be founded a classification of the internal organs. This was called 'comparative anatomy.' Thus comparative anatomy has arisen independently of zoology, and this independence of origin is the main reason for the distinction between the two which has been perpetuated down to the present day." (Pp. 9 and 10.)

The traditional distinction thus established between the two does not correspond to any difference of ends and methods. The purpose of both is in fact the recognition of the similarities and differences between organisms, and their classification on that basis, and both attain this result by means of similar logical processes of comparison and analogy. "In the case of whole groups of animals it is quite impossible to make a classification except after careful anatomical investigation. Their systematic affinities are brought to light only by a knowledge of their embryonic and larval states, because only in those states are found organs and characteristics which admit of legitimate and infallible comparison. How then would it be possible to classify these groups without consideration of their embryology? But it is not only in these extreme cases that systematization—which aims ultimately at the establishment of the degrees of similarity and of difference in the organisms, and which must therefore reach definite conclusions as to the real nature of these similarities and differences—must avail itself of all the instruments and methods which give us the most profound insight into the world of the living. The comparison must be extended to the minutest details of the organic structure—to the examination of the differences between the tissues, the cells, and down to the most intimate structural and physiological processes, as for example the process of metabolism. Neither can the classification neglect the recent discoveries concerning hemolytic and precipitant serums, which reveal a veritable blood-relationship between, for example, anthropomorphic apes and man, and a relationship of varying degree according to the animals compared." (Pp. 17 and 18.)

To these considerations which lead to a recognition of the advisability of abolishing the existing pedagogical distinction between zoology and comparative anatomy, is contrasted the opinion of those biologists who consider it the specific task of comparative anatomy not only to classify and compare organisms but also to seek the causes of their similarities or differences and to explain them by

phylogenetic hypotheses and theories of the origin and variations of species.

Giardina maintains, on the contrary, that the theory of heredity and the progress of phylogenetic studies have introduced no change into the *immediate* end or into the method of anatomical research or that of comparative morphology. "We do not now, nor did we ever, collocate two organisms in the system of classification because of a relationship already demonstrated; but rather we infer as probable a certain degree of relationship because comparative morphology, for an entirely different order of reasons, has placed them side by side in the system. The search for a given family-tree, also, is founded upon a putting in evidence, so far as is possible, of the similarities and differences between the individuals. The first point reached is ever an artificial provisional system of classification, but one which approaches the natural more and more as a greater number of forms and processes cooperate in its determination. The only additional and novel step then taken is the transcription of the results of systematic research into a slightly different language, in which certain terms of resemblance are translated into terms of succession and relationship. This step, philosophically considered, is of the greatest importance; and this explains the enthusiasm and number of investigators who have attacked the new problems. But while phylogeny has given a tremendous impetus to investigation in comparative morphology it has not at all changed the methods of research. There is no method peculiar to phylogeny. We have all learned, for example, that the method of comparative morphology is to discover homologies between organs. According to the modern transformist theories homologous organs are those which can be considered as derived from one and the same primitive organ, for example the upper limb of a man, the wing of a fowl, or the pectoral fins of a fish. We should err greatly if we thought that in this definition we had found a short-cut to the establishing of homologies; we should fare badly indeed if armed with such a definition we tried to make even one such determination. The difficulties in the way of the apprehension of homologies has continued unchanged: for us as for our predecessors the criterion is the most exhaustive examination possible of the organs to be compared. It is necessary to examine not only their external form and their relative position in the body, but also their internal structure and their relation to all the other groups of organs, to the vessels, or to the skeleton,—and, more than this, to study their manner of develop-

ment: as to the time of their appearance, their relative position, their inception from this or that germ-leaf, and so on." (Pp. 21-23.)

* * *

In qualifying the scope of comparative anatomy as exclusively descriptive, comparative and classificative, Giardina is nevertheless far from denying that biologists ought to concern themselves with the search for causes, or what he calls "causal explanations," of the characteristics and tranformations of organisms. What he affirms is merely that this task is to be reserved to those new branches of biological research (as, for example, the mechanics of development) which are characterized by the use of *experimentation*, understood in the most usual sense as consisting in the artificial production, optionally repeatable, of the facts or processes under consideration.

This tendency to make the distinction between the search for causes and that for resemblances coincide in a way with the distinction between experimentation and simple observation, cannot fail to appeal to those students of philosophy who, like the pragmatists, conceive the search for causes as not differing from the search after means which are calculated to induce or to impede given conditions.

It seems to me, however, that the statements of the author in this regard are somewhat open to criticism and that they should not be accepted without some reservation. More than once the idea is suggested, perhaps unintentionally, that to experimentation, understood in the sense above, is to be conceded less of importance as a means of classification—or of determining the similarities or differences between the things classified—than to observation properly so-called.

Now, not only in biology but also in chemistry and in physics and in every other branch of scientific research, the properties most important as criteria for classification and those which are most fittingly employed for the construction and delimitation of the various species or groups of objects or facts which are under consideration are not—and Giardina indeed notes this—exclusively, nor even principally, those which are accessible to direct observation unaccompanied by any *active* intervention on the part of the observer in inducing their appearance. Those very instruments which we call "instruments of observation," from the most simple such as the balance and the thermometer to the more complex, inasmuch as they are means of inducing or constraining bodies to produce effects

which they would not manifest spontaneously, and the production of which effects depends upon certain operations which we do upon said bodies (as transportation, contact, immersion etc.), can be regarded as true "instruments of experimentation" in the strictest sense. There is no doubt that if the division of labor did not enforce the distinction between the person who constructs a barometer, for example, and the one who uses it—still more so if the instrument were such as to require reconstruction for each new "observation" —there would be no hesitation in characterizing its use as an "experiment."

Again, it seems to me that the distinction between instruments which serve to bring within our range phenomena which already exist (for example a telescope or an ear-trumpet) and instruments which themselves produce the phenomena observed, should not be taken too literally. The majority of the conditions which we say *exist,* exist in fact only in the sense that we expect them, or believe them to be realizable, in given circumstances: thus the greater part of what we call the "properties" of a body—its hardness, mass, elasticity, etc.—refer, not to directly observable aspects of that body, but to reactions of the body itself when subjected to a certain "treatment."

Even the process of *measurement,* comparative *par excellence,* —the search for the dimensions of a body—consists much less in a recognition of similarities or differences than in the performance of operations upon the body to be measured and upon the units of measurement: operations which can become very complicated in case a certain degree of exactness is sought, as for example in geodetic measurements.

One of the most general of the characteristics of scientific progress is this very tendency to substitute, for classifications founded on external and more patent resemblances and differences of the objects or processes studied, other classifications which are based instead on similarities or differences which are manifested only when the things studied are subjected to definite operations and are obliged to act or react in artificially produced circumstances.

From this tendency, heretofore manifested especially in the sciences of physics and chemistry, there is no reason to believe that the biological sciences ought to be or can be exempt. It is for this reason that I find it hard to justify the distinction which Giardina would wish to emphasize between those branches of biology whose immediate field is the comparison and classification of organisms

and those whose object is the experimental study of the various modes of action or transformation in organisms in response to given stimuli or external conditions.

Considering therefore that the action or intervention of the scientist in the production of the facts which he studies has a no less important part in that which may be called the "descriptive" or "classificatory" phase of research than it has in the phase in which the causes or explanations are sought, it does not seem to me that the presence or absence of such intervention can constitute a differential characteristic upon which to base a distinction between the various branches of scientific research which refer to one and the same subject.

* * *

Among the arguments adduced by Giardina in support of the distinction between the divisions of biology which have a purely classificatory scope and those to which he reserves the epithet of "experimental" there is one on which he insists with particular emphasis. This he formulates by saying that as regards questions of genealogical dependence and the theories of transformation of species, mere observation and comparison of the facts does not lead to anything more reliable than more or less probable conjectures, while satisfactory conclusions can be reached only by having recourse to "experimental sanction."

In this case, too, it seems to me that the author's opinion is hardly sustained by an examination of the facts in other fields of scientific research. Astronomy, for example, which by the reliability and precision of its predictions merits to be regarded as almost the type of the sciences which arrive at reliable conclusions, certainly does not owe this prerogative to experiment, understood in the sense which he gives to the word.

If, on the other hand, we follow Cl. Bernard, or Jevons, in extending the concept of "experiment" to coincide with a process in which observation is preceded by deductive elaborations or anticipatory hypotheses, where facts are invoked to act as arbiters or means of elimination, we can then easily qualify even astronomy as an experimental science; but we must at the same time recognize the experimental character of the greater part of the so-called "*comparative*" sciences, from anatomy to glossology; inasmuch as in these too we are continually confronted by the presence of investigations undertaken for, and directed to, the purpose of obtaining a cor-

roboration of some theory or hypothesis suggested by a comparison between facts previously observed. But this is certainly not the sense which the author means to attribute to the word "experiment" when he opposes, for example, the mechanics of development to the other branches of biology.

* * *

Nor do I see how it is possible to uphold Giardina in his apparent intention to attribute to experimentation, understood in the sense given above, the possession of a peculiar prerogative as a means of reaching what he calls "causal explanations," or of recognizing the reasons for the laws and the uniformities which facts present.

This distinction between causal and non-causal explanations seems to me in itself unfounded. I can hardly see what explanations there are beyond those which recognize the dependence of the facts or laws to be explained upon others more general from which they proceed as consequences. Though commonly considered as more "causal" than any others, the explanations furnished by the science of mechanics have no significance beyond that which has just been stated.

The tendency shown by Giardina, along with a whole school of epistemological philosophers and theorists, to attribute to the explanations of mechanics the possession of a peculiar "rationality," as if they alone referred facts to their true causes, has been justly characterized as one aspect of the general tendency of the human mind to accept as innate and to regard as not needing further explanation only those facts or laws which relate to our most habitual experiences and which come to seem to us, on account of their frequency and familiarity, more "natural" than others—a tendency which, as Guastella has remarked recently (in his *Saggi sulla teoria della conoscenza*), leads to the implicit postulates upon which are based most systems of metaphysics.

It must be noted too that the prestige which has been given to the explanations of mechanics as compared with other kinds has been furthered by the fact that the conditions or causes therein considered (movement, flection etc.) are the very ones most subject to voluntary control—the only ones in reality that we can directly dominate.

This is furthermore confirmed by the fact that in this very field of mechanics as we pass from explanations which (like those con-

cerning equilibrium, or the action of bodies in contact) connote relations analogous to those which subsist between our bodies and the things which we touch or move,—as we pass from these explanations to those in which we appeal to the more general laws of motion (e. g., the principle of virtual work, or Newton's laws), any impression of a difference in "nature" or rationality between mechanical explanations and others disappears completely.

In this connection, a curious fact which has been noted as worthy the attention of the psychologists of knowledge is the contrast between the attitude of the students of the mechanical and physical sciences and that of the biologists, as regards their estimate of the scope and logical character of their respective fields of research.

Just at the time when the biologists were being led by their enthusiasm for their discoveries in the genealogical relations of species to regard biology as a science now prepared to pass from the purely descriptive and classificatory stage to that of a science capable of assigning the causes and giving the explanation of the facts in its domain, the students of mechanics were emerging from an evolution in exactly the opposite direction. The nature of this new attitude can be summed up in the well-known words of Kirchhoff: that the sole end of mechanics is to describe, as simply, completely and conveniently as possible, the actual motions of bodies; and that every theory, law or hypothesis of mechanics is nothing more than a means to this end and has no value or meaning except as it serves to attain to this end.

The reason for this contrast is to be found more than in anything else, it seems to me, in the fact that students of mechanics, either because of the greater simplicity of the relations studied or on account of the special intellectual preparation which studies in their field demand, have found themselves prepared earlier than any other class of scientists to analyze thoroughly the logical processes which they employ. They have thus been the first to recognize the fact that explanation is merely a means of "indirect description" (Mach)—to realize that between the search for the "why" and the search for the "how" there is no difference but one of degree. So that in this respect, and with regard to the ends and scope of their researches in general, the biologists are to a large extent still in bondage to certain views connected with metaphysical theories whose influence they consciously or unconsciously undergo; while the students of the mathematical and physical sciences have attained,

unaided, and almost independently of any direct influence by philosophical speculations, to a concept of "cause" and "explanation" differing little from that which is represented in the field of philosophy by the analyses of Hume: that is, to conceive of the search for causes, not as a search distinguishable from the search for similarities and differences or from the processes of pure classification, but rather as a search for *certain special similarities* (those which exist between the various orders of succession among facts) and for *certain special classifications* (those based upon a recognition of the rhythms or periods which such special similarities permit us to establish).

Giardina's book, besides the features to which I have referred, seems to me interesting also as symptomatic of the growing participation of the biologists in those new conceptions which have led the physicists and the student of mechanics to a clearer and more exact recognition of the character and scope of the theories and hypotheses of which they make use.

Though we may not be disposed to accept without some reservation the conclusions reached, or at least suggested and at times implied, by our author, as regards this last consideration, we must concede him the merit of having stated the questions clearly and of having greatly furthered their discussion in Italy; as has Driesch, among others, in Germany.

One of the best pages in the book is the concluding discussion of "causal inferences." In this the pragmatic conception of scientific theories as expressions of conditioned expectation or instruments for the forecasting of possible experiments is expounded with great clearness and accuracy:

"To every causal inference corresponds always an experiment, either actual or possible, or even simply thinkable. When we say, for example, that probably the well-known asymmetry of the soles depends upon an adaptation to their life at the bottom of the sea and upon the habit arising in this species, or in their progenitors, of lying on one side upon the opaque bottom (a habit useful for many reasons),—in such a statement we are unconsciously making experiments—*ideal* experiments. In fact, in the ultimate analysis, we are simply making the following affirmation: that if we by any means *could have* prevented the progenitors of the Pleuronectidae from going to the bottom, there would not have arisen any asymmetrical forms with the characteristics of the existing Pleuronectidae;—or again, once those progenitors had sunk to the bottom, if we had been

able to make them live on a transparent instead of an opaque bottom probably the migration of the eye, so characteristic of the species, would not have taken place.

"Thus when Darwin conceived the theory of natural selection, which is one of the causal explanations of the origin of new species from other pre-existing species, he did nothing after all but affirm as probable, by analogy with the results of artificial selection, that if he had had the means of altering any one of the internal or external conditions of life in an animal species and had been able to ascertain exactly, or even approximately, what were the useful properties and what the characteristics harmful to the species under the new conditions, he would have effected the gradual elimination of the individuals presenting in more marked form the harmful characteristics and a persistence of the individuals where the useful characteristics were more pronounced; and he would have been able to effect the elimination of the intermediate type of the species and the constitution of a new variety or species having in preponderance the more useful characteristics and therefore embodying in a maximum degree those adaptations which had been up to then interpreted as the expression of a finality of nature. The theory of selection thus resolves itself into a complex of experiments—conceptually, if not practically, possible." (P. 52.)

GIOVANNI VAILATI.

WILLIAM THOMSON, LORD KELVIN.

Sir William Thomson, who at the height of his fame was created the first Lord Kelvin, has died recently in his eighty-fourth year. He was one of the greatest mathematicians and physicists of all ages, and his views may be considered as the conservative scientific conception of the present age which just now is being vigorously attacked with more or less success by a fraction of the rising generation. He was born at Belfast, Ireland, June, 1824, and was appointed professor of natural history at the University of Glasgow in 1846. He held that chair until the close of his life. His investigations in the domains of mechanics, electricity, heat, magnetism, belong to the best scientific works of our age. His little textbook, *An Elementary Treatise on Natural Philosophy*, which he elaborated in company with P. G. Tait, has become a classic, and there is no one who has studied the subject but has used it in his

scientific education. Lord Kelvin's discoveries have also been applied to practical life, as is shown for instance in the part he took in laying the first cables across the Atlantic.

HUGO SCHUCHARDT ON ESPERANTO.

(Translation.)

To the Editor of The Monist:

In the October number of *The Monist* you place me "in the ranks of Esperantists." That is not correct. For twenty years I have endeavored to demonstrate that from a philological standpoint, whether the historical or psychological side be emphasized, the possibility of an artificial international language can not be contested; and I have finally expressed myself in the May number of the *Beilage zur Allgemeinen Zeitung*, with regard to and against Brugmann's point of view, and have especially declared again as formerly against the simile of the homunculus. No! "Languages are not living organisms like animals"; they are functions like eating, walking, etc.

I have never entered the lists for any *particular* international auxiliary language, neither for Volapük nor for Esperanto. I consider the formation of such a language as both possible and desirable and maintain the opinion that intercourse among the great nations will some time be so regulated that as far as possible each shall use his native language and each shall understand those of foreign countries.

HUGO SCHUCHARDT.

GRATZ, October 27, 1907.

BOOK REVIEWS AND NOTES.

SOZIOLOGIE. Positive Lehre von den menschlichen Wechselbeziehungen. Von *Gustav Ratzenhofer*. Leipsic: Brockhaus, 1907. Pp. 231,

General Ratzenhofer's *Soziologie* has been published by his son in a posthumous edition. The General himself may be remembered by many Americans who met him at the Scientific Congress in St. Louis. He was invited here on that occasion as a representative of sociology, but was not permitted to reach home alive. He died while on his return journey, October 8, 1904. In the meantime his son has published a little volume which contains the General's views on sociology. It treats first of the elements of sociological science, man's relation to his environment, the period of social development, social relations, and the origin of social institutions. In the second chapter the author discusses the factors of social development, geological conditions and the inherited dispositions of man, the significance of race and the relation of the races among themselves, traditional degeneration, the struggle for existence, and the significance of the leading ideas in different ages. The third chapter is devoted to social functions, to economy and politics. It contains a criticism of the program of the Social Democrats, explains the policy of power upon which the State is founded, the relation of religion to politics, and the private life of individuals. The fourth chapter treats of family, of race affiliation such as Judaism, and of class affiliation such as aristocracy, which constitute the ideas of nation and society. The fifth chapter deals with the principles of social development, individualism and socialism. It discusses integration and differentiation, progress and retrogression, liberty and compulsion, equality and authority, and finally the principles of the social order. So far General Ratzenhofer has considered the theories of sociology; the last two chapters are devoted to their practical application. Chapter six discusses the influence of individuals upon the social development, and chapter seven enters into some practical problems, such as the relation of the sexes, state hygiene, the problem of law and its practice, the executive power of State and army. He investigates minutely the principle of militarism and favors a diminution of the military burden. Finally he touches upon political economy, and his concluding words express his prospects of the future.

In the Preface General Ratzenhofer's son briefly sketches the life of his father, who was born in Vienna, July 4, 1842. His great-grandfather had been a locksmith in Donauwörth, afterward removing to Vienna. His grandfather was distinguished by his fondness for thinking and inventing. He had constructed an *artificial* astronomical clock and could never liberate himself

from the hope of perfecting a *perpetuum mobile*. The father of our author was a typical son of Vienna. He loved music and society, but was at the same time a good business man. The son, later Lieutenant General Ratzenhofer, our author, inherited the temperament of both his father and grandfather. He could be very jolly, and at the same time he was thoughtful and exact in his work. His mother died at an early age, and so Dr. Ratzenhofer, the editor, knows very little of her family. Our author grew up under very difficult conditions. His father had died when he was still at a tender age, and he entered the army as a cadet, but he had a hard time. His pay was small, and yet he needed money to keep up appearances required by the social demands of his position. He studied and worked with great diligence, and finally was appointed a lieutenant in 1864. The Austrian wars in 1866 against Prussia and the Bosnian occupation (1878) passed by without any significance in his career because he was still in an inferior position. Gradually, however, he became known, mainly through his literary work, and when he had reached his thirty-third year he entered the general staff, which was the beginning of a more successful career. He married Fräulein Marie von Herget, and his married life was to the very end a happy one. In 1898 he was relieved of his command of a brigade in Lemberg, and appointed President of the military courts of justice, in which high position, however, he did not find the satisfaction which he had expected. His juridical work was not to his liking, for his sympathies and the emotions of his heart were tied down by definite legal forms and regulations which he felt to be a very unwelcome restriction. In consequence of a conflict which he had upon a question of principle, he quitted active service and retired from the army. He accepted the invitation which was tendered him in 1904 to attend the Scientific Congress at St. Louis, but this journey was the conclusion of his life. He had not enjoyed a regular scientific education, but had acquired his scientific knowledge by private study, and yet he distinguished himself to a considerable degree mainly in the field of sociological questions. It is especially remarkable that he, as an Austrian and a man of military education, attained to a liberal view of conditions and roused the interest even of students outside the borders of his country. Nevertheless we find that his views are greatly adapted to Austrian conditions, and many of his opinions would be unintelligible unless we bear in mind the conditions in the development of Austria, such as the overwhelming demands of the Hungarians, the clannishness of the Jews, and the complications which the Roman Church caused in the economy of the Austrian government. Though many may regard his views as based on prejudice, Austrians perhaps will recognize in them the expression of a liberal minded man whose views are mainly formed by the social conditions of the Austrian empire.

PHILO. Par *L'Abbé Jules Martin*. Paris: Alcan, 1907. Pp. 301, Price, 5 fr.

Jules Martin, a Roman Catholic Abbot, has written a splendid book on Philo which bids fair to eclipse everything else that has been done in this line. The Abbot is well familiar with patristic literture and can speak with authority. He goes over the whole field by telling first the life of Philo, and discussing the works he has written, their authenticity, their date, their subjects, etc. He then explains the ideas of inspiration, the allegorizing tendency

among the Jews and the early Christians, the ideas of philosophers, and the influence which Philo exercised on them.

Philo's philosophy is discussed in the second book, pages 49 to 104. Here the author explains Philo's ideas of the nature of God, of the Logos, and the multiplicity which he calls the powers of God, the world as exercising a function of dividing things and organizing them with the several objects that exist in material reality, the ideas of continued creation and of providence.

The third book is devoted to the relation of God to man, the significance of philosophy in the recognition of the highest good and the ideal of perfection, the means of grace, and the perfect life which was practised among the Essenes and the Therapeuts.

The fourth and last book, pages 209 to 298, discusses Philo's idea of the universe, its constitution, its duration, time, space, the mystic significance of numbers, the stars, etc. Further the origin of the soul, the immortality of the soul and its parts, the senses and the passions, the significance of language, self-consciousness, and the immortality of the soul. The last chapter explains Philo's ideas of family and education, of city life, of slavery, of religion and of tolerance. In conclusion Abbé Martin says that two things are remarkable: first that Philo does not speak of the Messiah, and that he does not in any way resemble the Pharisee as we know him from the Gospel. He has not the narrowness of a zealot, nor does he admit that the sacrifice of bullocks should be regarded as piety, for he indorses the spirit of Isaiah.

The Abbot says: "In spite of the numerous works which were devoted to him in the eighteenth century, Philo is scarcely known to the reading public except by name, nor has he exercised otherwise a great influence. Plotinus, Porphyry, and Proclus follow other masters. Many Christians during the first century have read Philo, and this mainly for the sake of the piety which his works breathe. St. Augustine studied Plotinus. He did not study Philo, he did not like the allegorical sense which Philo exhibits. During the Middle Ages neither Jews nor Christians knew Philo; the scholars of the sixteenth and those of the seventeenth century studied him, but only to their own profit. The great labors of New Testament criticism during the last four centuries have not given publicity to the resemblances between the epistle to the Hebrews and Philo. Such was his fate, yet he does not deserve to be forgotten." Among those who controlled Judaism and Greek civilization he alone remains; others who attempted the same, especially Hermippos and Aristobulos, have been lost, and so Philo has started one of the greatest movements in the history of mankind.

The Abbot is perhaps more familiar with the patristic literature than any other scholar, but in his investigation he has perhaps purposely omitted all reference to the possible connection of Philo with the East, especially the ideas which may have spread through Judaism into the Græco-Roman world from the Zendavesta, in which the idea of the divine world played such an important part. This side of the problem has been covered by Professor Mills in his latest great work, *Zarathushtra, Philo, the Achæmenids and Israel*, (Chicago: Open Court Publishing Co., 1907.)

La philosophie de M. Sully Prudhomme. Par *Camille Hémon.* Paris: Alcan, 1907. Pp. 464. Price, 7 fr. 50.

M. Sully Prudhomme is one of the most famous authors of France, but outside of France, although we have heard his name often, we are not very familiar with his literary significance. Here is a book that will help us. Camille Hémon, professor at the Lyceum and High School at Nantes, has undertaken the task of presenting to us in a voluminous book a summary of Sully Prudhomme, as man, poet, author, and philosopher, which is furnished with a preface by M. Sully Prudhomme himself. We will here limit ourselves in briefly noting down the main events of M. Prudhomme's life. His real name is René-François-Armand Prudhomme. He was born at Paris, March 16, 1839. When he began to write he adopted the name "Sully" as a kind of author's pseudonym, and he chose it because it had been a nickname of his father in his childhood. In his second year he lost his father who had been a business man. His mother, who was very delicate, did not exercise a great influence upon him, nor did his uncle who was in charge of his education, putting him at an early age into a boarding school where he seriously realized his homeless condition. He completed his studies at the Lyceum Bonaparte, to-day called Condorcet. Though he distinguished himself mainly in *belles lettres*, he chose the sciences as his specialty, and prepared himself for an examination to attend the Polytechnic. He took his bachelor's degree in the sciences in 1857, and took a special course in mathematics, when a disease of the eyes modified his plans and interfered with his scientific studies. He had to give up the Polytechic, but his good scientific education laid the basis for a habit of exact methods and a taste for abstraction. When he now for the second time turned to *belles letres*, he passed his examination as bachelor of letters at Paris in 1858. At that time he passed through a short but very intense crisis of religious faith. In his mother's family circle he became enthusiastic for the dogmas and moral ideas of Catholicism, but his fervor did not last long. Having returned to Paris, he took up philosophy, studied the works of Strauss and other religious critics, which produced in him the sad sentiment of despair which is echoed in his sonnets entitled "Doubt." Soon afterward he was engaged in commercial correspondence in the factories at Creusot, where he remained about 18 months. The year 1859 marks the beginning of his poetic and especially also of his philosophical career. In his leisure hours he began to translate the first canto of *De Natura Rerum* of Lucretius, which he accompanied with a preface and a discussion which plainly manifest the influence of German philosophy on him, especially that of Kant. Having returned to Paris he took up the study of jurisprudence, and established himself at the same time as a clerk in a legal establishment in 1861. He found it as little to his advantage to continue in this career as in his industrial work. He continued to make verses and sometimes spent nights at them. He communicated them first in a society of students of which he was a member (it was called Conférence La Bruyère) and from which sprang many well-known authors and remarkable statesmen. He inherited a little fortune which came at a very opportune time at this moment of his life, for it rendered his pen independent and gave him a solid foundation for his life. His first work in verse entitled "Stanzas and Poems" appeared in 1865.

Between 1868 and 1878 appeared several books of his entitled Solitude, The Impressions of the War, France, The Revolt of the Flowers, Diverse Poems, The Destinies, and The Zenith. He felt more than any other the terrible year of 1870. He himself entered as a volunteer in the mobile guard which defended Paris during the siege, although his age of 30 would have permitted him to serve in the less exposed national guard. The national misfortune stirred his heart deeply, and the result of it was the grand poems entitled "Justice" and "The Zenith." Among his philosophical works we have to mention one entitled "Expression in the Fine Arts," which is praised for its scientific exactness so as to equal scientifically the essays of Helmholtz and Chevreul. Another philosophical book of his is entitled "What do I Know? An Inquiry into Consciousness," and another scientific work is entitled "The Origin of Terrestrial Life." In 1897 he published his "Poetic Testament" and his "Problem of Final Causes." In 1905 he wrote an essay on "True Religion According to Pascal," and three sociological studies, "The History of the Social State," "The Credit of Science" and "On National and International Lines." His last works are "Fundamental Definitions of the Most General and the Most Abstract Ideas" and his "Psychology of Free Will." An important work of social philosophy *La Possession de l'homme par l'homme* is at present in preparation.

THE MIND AND THE BRAIN. By *Alfred Binet*. (International Scientific Series, Vol. LXXXIX.) London: Kegan Paul, Trench, Trübner & Co.

This is an authorized translation of the author's *L'âme et le corps*, and is edited by Mr. F. Legge. It is a contribution to a "problem" that will exercise the wit of man until he is better advised than he has as yet proved himself to be. Has the connection between mind and mind: indeed the connection between one period of the consciousness of a single mind and the next conjoining period of the same ever yet been masterfully made plain? Had that been done, might it not turn out that the "problem" to which this work is devoted would be perfectly solved by supposing a community of nature more or less between mind and what we take to be not-mind? Are there no "facts" to support such a supposition?

In perusing such contributions as this book; indeed, in perusing most of the contributions to psychology, one is continually prompted to recall the verses,

> "Viewing all things unremittingly,
> In disconnection dull and spiritless."

If mind is anything, it is continuous and *not* discrete. A "state" of consciousness is a fiction, and a misleading one at that. There is nothing whatever static about consciousness. It is a continuous flow of sensibility. For divers uses, we insert into this continuous flow a variety of distinctions and boundaries, just as the geometer inserts into continuous space his distinctions and boundaries. Such distinctions while not arbitrary are yet artificial and are liable to become traps for the unwary.

How is one "idea" connected with another? If we take the idea as a single discrete entity the "problem" is of course insoluble just as is the "prob-

lem" of soul and body when each are taken as incommunious with each other. But suppose a communion more or less, and the "problem" vanishes.

Ideas do not abut against one another with boundaries of cleavage, nor sensation against perception, nor that against the next ranking activity of mind. All such appropriations of mind are *vicinities*, each blending ineffably into neighboring vicinities.

The conception of matter has become so attenuated under the illumination of recent years that should it be ascertained that the details of our mental furniture have *mass* it would be pretty hard to establish any distinction of ultimate validity other than a distinction of degree between mental and physical being.

It, of course, goes without saying that any work from the pen of M. Binet is specially distinguished as to its quality, and that it will present little if anything that can be assailed upon the basis of his fundamental presuppositions.

F. C. RUSSELL.

SYLLABARY OF CHINESE SOUNDS. By *Friedrich Hirth*. Extracted from Carnegie Institution of Washington Publication No. 54, Research in China, Volume I, Part II, pages 511-528. June, 1907.

The Carnegie Institution of Washington has published a small pamphlet on *Research in China* entitled "Syllabary of Chinese Sounds" by Friedrich Hirth, which is a proposition to simplify Chinese transcription, and it would be highly desirable if Chinese scholars could be prevailed upon to adopt it for all practical purposes. The old transcriptions of Williams and Wade, though great improvements on the earlier ones of Ritchie, etc., contain some drawbacks which Professor Hirth has adroitly removed. At any rate it would be desirable to have uniformity of some kind in this chaos of methods. The Syllabary itself contains 10 large pages, and the whole pamphlet with the introduction is not more than twenty pages.

LA GÉOMÉTRIE ANALYTIQUE GÉNÉRALE. By *H. Laurent*. Paris: Hermann, 1906. Pp. 151. Price, 6 francs.

The author presents a new solution of the problem which has originated in the domain of mathematics since the rise of non-Euclidean geometry. He inscribes his book with the motto "If God has created the universe, man has created space in order to explain and coordinate his sensations. He would have created it of two dimensions if he had been condemned to immobility and limited to the sense of sight." Without exactly agreeing with the negative part of his statement we will set forth the purpose of Professor Laurent.

His book is an answer to the question, "What are the irreducible hypotheses that must be made to find out the geometrical propositions of Euclid?" He speaks of hypotheses, not of axioms, for he does not intend to make use of axioms. He simply examines the consequences of certain hypotheses and their contraries. His aim is to build up an abstract and purely logical science that has no other relation to geometry than the names of objects upon which it speculates, and which have only as abstract an existence as numbers. A chief point in his exposition is the doctrine of "displacement without change

of form," and he undertakes to prove that it is sufficient only to modify this proposition to change the Euclidean geometry into the one of Riemann or of Lobatchewski or others less well known.

The present book may accordingly be regarded as an introduction to the general theory of the substitution that can be made for the different geometries, and we hope to be able to give it a more thorough analysis after a more careful study of the book.

ART ET PSYCHOLOGIE INDIVIDUELLE. Par *Lucien Arréat*. Paris: Alcan. Price, 2 fr. 50.

In the sketch with which this volume opens the author's purpose is to illuminate or to direct the general theories of the beautiful, by the particular experience of the individual. He thinks it may be useful, or at least interesting, to define the relation of one's esthetical views with their application in real life, with external influences, and with hereditary disposition. The opinions about art discussed in this "sketch" are taken up again and completed in a review of the more recent works published on the subject.

This is followed by two notes, one on "Literary Invention," the other on the "Association of Ideas," both connected with the "sketch."

Some "Observations on a Musician" form a new contribution to the study of the psychology of the individual.

CIÒ CHE È VIVO E CIÒ CHE È MORTO DELLA FILOSOFIA DI HEGEL CON UN SAGGIO DI BIBLIOGRAFIA HEGELIANA di *Benedetto Croce*. Bari: Laterza & Figli, 1907, Pp. 282.

In our days when Hegelian philosophy still continues to influence our universities although it is claimed to be antiquated, an investigation such as Benedetto Croce has undertaken must be regarded as timely. He investigates what survives and what is practically dead in the Hegel system. He discusses Hegel's dialectics and conception of morality. He points out the false application of Hegel's philosophy and the truth that is contained in it. He comes to the conclusion that Hegel has not overcome dualism and finds it impossible to accept Hegel's philosophy as a whole without having it first thoroughly subjected to a careful criticism.

NIETZSCHE'S ZARATHUSTRA. Von *Prof. Karl Knortz*. Halle: Peter, 1906. Pp. 66.

This pamphlet is an enthusiastic account of Nietzsche's philosophy, with special reference to his *Thus Spake Zarathustra*. Professor Knortz puts his own interpretation on this exceedingly radical philosopher, and sees in him one of the most original and interesting phenomena in modern thought. We do not agree with Professor Knortz, but we have read his pamphlet with pleasure, and will only add that the historical Zoroaster is at present too well known not to disturb us in having him, the great preacher of Ahura Mazda, the Lord Omnipotent, represent Nietzsche's atheism. We will further add that the name Zarathustra does not mean "God Star," as was supposed some time ago. Though the origin of the name is doubtful, scholars all agree

that *ustro* means "camel"; while the first part of the word may mean "fierce," or "tormenting," or "robbing" or "old." The name is certainly a genuine personal name and testifies most clearly to a real personality who bore it, for a more prosaic name could not have been invented for the leader of a most effective religious reform.

THE ORIGIN AND DEVELOPMENT OF THE MORAL IDEAS. By *Edward Westermarck*. London: Macmillan, 1906. Two volumes. Vol. I. Pp. 716.

The well-known author of the *History of Human Marriage* analyses in the present volume the moral concepts of right, wrong, duty, justice, virtue, merit, etc., and finds that there are two kinds of moral emotions, indignation and approval, at the bottom of every moral concept (p. 131). The main interest of the book lies in the enormous material which Westermarck has collected on homicide, parricide, feticide, human sacrifices, blood revenge, capital punishment, the duel, charity, hospitality, slavery, etc.

Westermarck's philosophical attitude is brought out in the following passages:

"Our moral consciousness belongs to our mental constitution, which we cannot change as we please. We approve and we disapprove because we cannot do otherwise. Can we help feeling pain when the fire burns us? Can we help sympathizing with our friends? Are these phenomena less necessary, less powerful in their consequences, because they fall within the subjective sphere of experience? So, too, why should the moral law command less obedience because it forms part of our own nature?

"Far from being a danger, ethical subjectivism seems to me more likely to be an acquisition for moral practice. Could it be brought home to people that there is no absolute standard in morality, they would perhaps be somewhat more tolerant in their judgments, and more apt to listen to the voice of reason. If the right has an objective existence, the moral consciousness has certainly been playing at blindman's buff ever since it was born, and will continue to do so until the extinction of the human race. But who does admit this? The popular mind is always inclined to believe that it possesses the knowledge of what *is* right and wrong, and to regard public opinion as the reliable guide of conduct. We have, to be sure, no reason to regret that there are men who rebel against the established rules of morality; it is more deplorable that the rebels are so few, and that, consequently, the old rules change so slowly. Far above the vulgar idea that it has its existence in each individual mind, capable of any expansion, proclaiming its own right to exist, if needs be, venturing to make a stand against the whole world. Such a conviction makes for progress."

Behind the Scenes with the Mediums

By DAVID P. ABBOTT

328 Pages, Cloth, Gilt Top - - - Price, $1.50 net

TABLE OF CONTENTS

THE OPEN COURT PUBLISHING CO., 1322 Wabash Ave., Chicago

The Story of Samson

And Its Place in the Religious Development of Mankind.

By Paul Carus. 80 illustrations. Pp. 183. Comprehensive index. Boards, $1.00 net. (4s. 6d. net.)

Dr. Carus contends that Samson's prototype is to be found in those traditions of all primitive historical peoples which relate to a solar deity. He believes that genuine tradition, no matter how mythological, is more conservative than is at first apparent. Though the biblical account of Samson's deeds, like the twelve labors of Heracles, is the echo of an ancient solar epic which glorifies the deeds of Shamash in his migration through the twelve signs of the zodiac, there may have been a Hebrew hero whose deeds reminded the Israelites of Shamash, and so his adventures were told with modifications which naturally made the solar legends cluster about his personality.

References are fully given, authorities quoted and comparisons are carefully drawn between Samson on the one hand, and Heracles, Shamash, Melkarth and Siegfried on the other. The appendix contains a controversy between Mr. Geo. W. Shaw and the author in which is discussed at some length the relation between myth and history.

Chinese Thought

An Exposition of the Main Characteristic Features of the Chinese World-Conception. By Paul Carus. Being a continuation of the author's essay, Chinese Philosophy. Illustrated. Index. Pp. 195. $1.00 net. (4s. 6d.)

This book contains much that is of very great interest in the development of Chinese culture. Beginning in the first chapter with a study of the earliest modes of thought-communication among primitive people of different parts of the world, and tracing the growth of the present system of Chinese caligraphy. In "Chinese Occultism" some interesting Oriental mystical ideas are explained as well as the popular methods of divination by means of trigrams and the geomancer's compass. In a special chapter the zodiacs of different nations are compared with reference to the Chinese zodiac and also to a possible common Babylonian origin. This chapter contains many rare and valuable illustrations representing almost all known zodiacs from those of Egypt to the natives of the Western hemisphere. The influence of Confucius is discussed, and a hurried recapitulation of the most important points in Chinese history is given together with a review of the long novel which stands in the place of a national epic. Chinese characteristics and social conditions have their place in this volume as well as the part played in China by Christian missions, and the introduction of Western commercialism. The author's object is to furnish the necessary material for a psychological appreciation of the Chinese by sketching the main characteristic features of the ideas which dominate Chinese thought and inspire Chinese morality, hoping thereby to contribute a little toward the realization of peace and good will upon earth.

Chinese Life and Customs

By Paul Carus. With illustrations by Chinese artists. Pp. 114. 75c. net. (3s. 6d. net.)

This book is little more than a compilation of Chinese illustrations accompanied with only as much text as will suffice to explain them, and what further material has been added is merely in the way of quotations from Chinese literature. The intention is to make the Chinese people characterize themselves by word and picture. Child rhymes, love lyrics and songs of revelry are introduced in translation from Chinese poetry which is recognized as classical. The illustrations which form the great body of the book are from the most authentic Chinese source of information concerning modern life in China unaffected by the aggressive Occidental foreigners. The book is divided into chapters on "Annual Festivals," "Industries and Foreign Relations," "Confucianism and Ancestor Worship," "Taoism and Buddhism," "Childhood and Education," "Betrothal and Marriage," "Social Customs and Travels," "Sickness and Death."

THE OPEN COURT PUBLISHING CO., 1322 Wabash Ave., Chicago

Second Edition, thoroughly Corrected and Revised, with Portrait.

Species and Varieties:

Their Origin by Mutation

By Hugo de Vries

Professor of Botany in the University of Amsterdam.

Edited by Daniel Trembly MacDougal, Director,
Department of Botanical Research, Carnegie Institution of Washington
xxiii+830 pages

THE belief has prevailed for more than half a century that species are changed into new types very slowly and that thousands of years were necessary for the development of a new type of animal or plant. After twenty years of arduous investigation Professor de Vries has announced that he has found that new species originated suddenly by jumps, or by "mutations," and in conjunction with this discovery he offers an explanation of the qualities of living organisms on the basis of the conception of unit-characters. Important modifications are also proposed as to the conceptions of species and varieties as well as of variability, inheritance, atavism, selection and descent in general.

The announcement of the results in question has excited more interest among naturalists than any publication since the appearance of Darwin's Origin of Species, and marks the beginning of a new epoch in the history of evolution. Professor de Vries was invited to deliver a series of lectures upon the subject at the University of California during the summer of 1904, and these lectures are offered to a public now thoroughly interested in modern ideas of evolution.

The contents of the book include a readable and orderly recital of the facts and details which furnish the basis for the mutation-theory of the origin of species. All of the more important phases of heredity and descent come in for a clarifying treatment that renders the volume extremely readable to the amateur as well as to the trained biologist. The more reliable historical data are cited and

the results obtained by Professor de Vries in the Botanical Garden at Amsterdam during twenty years of observations are described.

Not the least important service rendered by Professor de Vries in the preparation of these lectures consists in the indication of definite specific problems that need investigation, many of which may be profitably taken up by anyone in a small garden. He has rescued the subject of evolution from the thrall of polemics and brought it once more within reach of the great mass of naturalists, any one of whom may reasonably hope to contribute something to its advancement by orderly observations.

The text of the lectures has been revised and rendered into a form suitable for permanent record by Dr. D. T. MacDougal who has been engaged in researches upon the subject for several years, and who has furnished substantial proof of the mutation theory of the origin of species by his experimental investigations carried on in the New York Botanical Gardens.

Price, postpaid $5.00 (21s.) net. xxiii + 830 pages, 8 vo., cloth, gilt top

The Open Court Publishing Company

1322 Wabash Avenue, Chicago

London: Kegan Paul, Trench, Trübner & Co., Ltd.

_____ 190____

The Open Court Publishing Co.

1322 Wabash Avenue, Chicago

Gentlemen:

Please enter an order for the undersigned for _____ *cop*____ *of Hugo de Vries' "Species and Varieties, Their Origin by Mutation," at $5.00 per copy, for which find enclosed* _____ *for $*_____ *Address the book as follows:*

_____

_____

_____

Our Children

Hints from Practical Experience for Parents and Teachers. By Paul Carus

Pp. 207. $1.00 net. (4s. 6d. net)

In the little book Our Children, Paul Carus offers a unique contribution to pedagogical literature. Without any theoretical pretensions it is a strong defense for the rights of the child, dealing with the responsibilities of parenthood, and with the first inculcation of fundamental ethics in the child mind and the true principles of correction and guidance. Each detail is forcefully illustrated by informal incidents from the author's experience with his own children, and his suggestions will prove of the greatest possible value to young mothers and kindergartners. Hints as to the first acquaintance with all branches of knowledge are touched upon—mathematics, natural sciences, foreign languages, etc.—and practical wisdom in regard to the treatment of money, hygiene and similar problems.

PRESS NOTICES

"Brightly written, broad-minded, instructive, this book deserves serious perusal and praise."
—CHICAGO RECORD-HERALD.

"'Our Children' has a value which it is difficult to exaggerate. The strong common sense of the book as a whole can better be judged from an extract than from any praise of it, however particularized.

"It is difficult to conceive of anything coming up in relation of parent or teacher to a child which does not find discussion or suggestion in this compact and helpful little book. It will be an aid to parents and teachers everywhere—an education for them no less than for the child."
—THE CHICAGO DAILY NEWS.

"From my own personal point of view I can only welcome this volume in our pedagogical literature and express the hope that it may become a household book in the library of every parent and teacher."
M. P. E. GROSZMANN, Pd. D.,
Director Groszmann School for Nervous Children

"Mr. Carus writes in a most practical manner upon his subject, setting before the reader the various problems common to all parents in dealing with their offspring. This book is admirable throughout in the author's treatment of his subjects, as the book is built from the experiences of parents and teachers and, therefore, cannot fail to be practicable."
—THE BOSTON HERALD.

"For the training of children I know of no book in which there is so much value in a small compass as in this."
—THE TYLER PUBLISHING CO.

"Little things are recommended that will appeal to the child's understanding and add to his interest in his work."
—CLEVELAND PLAIN DEALER.

"Its author has given to the world a careful, loving, thoughtful set of rules which may be used with profit in the bringing up of the young."
—THE MANTLE, TILE AND GRATE MONTHLY.

"We feel certain that any parent who thoughtfully reads and studies this book will be richly paid; and if the readers be parents with growing children they will keep the book by them for frequent consultation; not for iron rules but for sympathetic suggestion."
—THE COMMERCIAL NEWS (Danville, Ill.)

"At once the reader knows that he is in touch with a mind that is accustomed to sincere and deep thinking. The whole book is a plea for a serious notion of parenthood. The author touches one topic after another with a fine sense of feeling for the 'warm spot' in it.

"The use of money, square dealing, worldly prudence, sympathy with animals, treatment of a naughty child, self criticism, and punishment, are some of the more important themes of the book."
—THE SUBURBAN.

The Open Court Publishing Co., 1322 Wabash Ave., Chicago

Space and Geometry in the Light of Physiological, Psychological and Physical Inquiry. By Dr. Ernst Mach, Emeritus Professor in the University of Vienna. From the German by Thomas J. McCormack, Principal of the LaSalle-Peru Township High School. 1906. Cloth, gilt top. Pp. 143. $1.00 net. (5s. net.)

In these essays Professor Mach discusses the questions of the nature, origin, and development of our concepts of space from the three points of view of the physiology and psychology of the senses, history, and physics, in all which departments his profound researches have gained for him an authoritative and commanding position. While in most works on the foundations of geometry one point of view only is emphasized—be it that of logic, epistemology, psychology, history, or the formal technology of the science—here light is shed upon the subject from all points of view combined, and the different sources from which the many divergent forms that the science of space has historically assumed, are thus shown forth with a distinctness and precision that in suggestiveness at least leave little to be desired.

Any reader who possesses a slight knowledge of mathematics may derive from these essays a very adequate idea of the abstruse yet important researches of metageometry.

The Vocation of Man. By Johann Gottlieb Fichte. Translated by William Smith, LL. D. Reprint Edition. With biographical introduction by E. Ritchie, Ph. D. 1906. Pp. 185. Cloth, 75c net. Paper, 25c; mailed, 31c. (1s. 6d.)

Everyone familiar with the history of German Philosophy recognizes the importance of Fichte's position in its development. His idealism was the best exposition of the logical outcome of Kant's system in one of its principal aspects, while it was also the natural precurs r of Hegel's philosophy. But the intrinsic value of Fichte's writings have too often been overlooked. His lofty ethical tone, the keenness of his mental vision and the purity of his style render his works a stimulus and a source of satisfaction to every intelligent reader. Of all his many books, that best adapted to excite an interest in his philosophic thought is the Vocation of Man, which contains many of his most fruitful ideas and is an excellent example of the spirit and method of his teaching.

The Rise of Man. A Sketch of the Origin of the Human Race. By Paul Carus. Illustrated. 1906. Pp. 100. Boards, cloth back, 75c net. (3s. 6d. net.)

Paul Carus, the author of The Rise of Man, a new book along anthropological lines, upholds the divinity of man from the standpoint of evolution. He discusses the anthropoid apes, the relics of primitive man, especially the Neanderthal man and the ape-man of DuBois, and concludes with a protest against Huxley, claiming that man has risen to a higher level not by cunning and ferocity, but on the contrary by virtue of his nobler qualities.

THE OPEN COURT PUBLISHING CO., 1322 Wabash Ave., Chicago

Aristotle on His Predecessors. Being the first book of his metaphysics. Translated from the text of Christ, with introduction and notes. By A. E. Taylor, M. A., Fellow of Merton College, Oxford; Frothingham Professor of Philosophy in McGill University, Montreal. Pp. 160. Cloth, 75c net. Paper, 35c postpaid.

This book will be welcome to all teachers of philosophy, for it is a translation made by a competent hand of the most important essay on the history of Greek thought down to Aristotle, written by Aristotle himself. The original served this great master with his unprecedented encyclopedic knowledge as an introduction to his Metaphysics; but it is quite apart from the rest of that work, forming an independent essay in itself, and will remain forever the main source of our information on the predecessors of Aristotle. Considering the importance of the book, it is strange that no translation of it appears to have been made since the publication of that by Bekker in 1831.

The present translation has been made from the latest and most critical Greek text available, the second edition of W. Christ, and pains have been taken not only to reproduce it in readable English, but also to indicate the exact way in which the translator understands every word and clause of the Greek. He has further noted all the important divergencies between the readings of Christ's text and the editions of Zellar and Bonitz, the two chief modern German exponents of Aristotelianism.

Not the least advantage of the present translation is the incorporation of the translator's own work and thought. He has done his best, within the limited space he has allowed himself for explanations, to provide the student with ample means of judging for himself in the light of the most recent researches in Greek philosophical literature, the value of Aristotle's account of previous thought as a piece of historical criticism.

Zarathushtra, Philo, the Achaemenids and Israel. A Treatise Upon the Antiquity and Influence of the Avesta. By Dr. Lawrence H. Mills, Professor of Zend Philology in the University of Oxford. 1906. Pp. 460. Cloth, gilt top. $4.00 net.

Professor Lawrence H. Mills, the great Zendavesta scholar of Oxford, England, has devoted his special attention to an investigation and comparison of the relations that obtain between our own religion, Christianity—including its sources in the Old Testament scriptures—and the Zendavesta, offering the results of his labors in a new book that is now being published by The Open Court Publishing Company, under the title, "Zarathushtra, Philo, the Achaemenids and Israel, a Treatise upon the Antiquity and Influence of the Avesta." We need scarcely add that this subject is of vital importance in theology, for the influence of Persia on Israel and also on the foundation of the Christian faith has been paramount, and a proper knowledge of its significance is indispensable for a comprehension of the origin of our faith.

Babel and Bible. Three Lectures on the Significance of Assyriological Research for Religion, Embodying the most important Criticisms and the Author's Replies. By Dr. Friedrich Delitzsch, Professor of Assyriology in the University of Berlin. Translated from the German. Profusely illustrated. 1906. Pp. xv, 240. $1.00 net.

A new edition of "Babel and Bible," comprising the first, second and third lectures by Dr. Friedrich Delitzsch, complete with discussions and the author's replies, has been published by The Open Court Publishing Company, making a stately volume of 255 pages.

THE OPEN COURT PUBLISHING CO., 1322 Wabash Ave., Chicago

Friedrich Schiller

"A Sketch of His Life and an Appreciation of His Poetry. By Dr. Paul Carus. Profusely illustrated. 1905. Pp. 102, octavo. Boards, cloth back, illustrated cover, 75c net. (3s. 6d.)

"This adequately illustrated and tastefully bound volume by Mr. Paul Carus is an admirable memorial of the recent Schiller Centenary. In addition to a biographical sketch we have two thoughtful essays by Dr. Carus on Schiller as a philosophical poet and on Schiller's poetry. Both have well-chosen selections of considerable extent, and it was a good idea to present these illustrative excerpts in both German and English."—*The Outlook.*

Eros and Psyche

A Fairy Tale of Ancient Greece.

Retold After Apuleius. By Dr. Paul Carus. Half-tone reproductions, with ornamental borders, of the famous illustrations of Paul Thumann. Printed from pica type on Strathmore deckle-edge paper, elegantly bound, and with classic cover design by E. Biedermann. One of the quaintest stories of the world's folklore. Pp. xv, 108. Souvenir edition with 41 beautiful pen-and-ink drawings and eleven half-tone plates. Strathmore paper, gilt top. $1.50 net. (6s. net.)

THE OPEN COURT PUBLISHING CO., 1322 Wabash Ave., Chicago

Essay on the Creative Imagination. By Prof. Th. Ribot. Translated from the French by A. H. N. Baron, Fellow in Clark University. 1906. Cloth, gilt top. Pp. 357. $1.75 net. (7s. 6d. net.)

Imagination is not the possession only of the inspired few, but is a function of the mind common to all men in some degree; and mankind has displayed as much imagination in practical life as in its more emotional phases—in mechanical, military, industrial, and commercial inventions, in religious, and political institutions as well as in the sculpture, painting, poetry and song. This is the central thought in the new book of Th. Ribot, the well-known psychologist, modestly entitled An Essay on the Creative Imagination.

It is a classical exposition of a branch of psychology which has often been discussed, but perhaps never before in a thoroughly scientific manner. Although the purely reproductive imagination has been studied with considerable enthusiasm from time to time, the creative or constructive variety has been generally neglected and is popularly supposed to be confined within the limits of esthetic creation.

Our Children. Hints from Practical Experience for Parents and Teachers. By Paul Carus. Pp. 207. $1.00 net. (4s. 6d. net.)

In the little book Our Children, Paul Carus offers a unique contribution to pedagogical literature. Without any theoretical pretensions it is a strong defense for the rights of the child, dealing with the responsibilities of parenthood, and with the first inculcation of fundamental ethics in the child mind and the true principles of correction and guidance. Each detail is forcefully illustrated by informal incidents from the author's experience with his own children, and his suggestions will prove of the greatest possible value to young mothers and kindergartners. Hints as to the first acquaintance with all branches of knowledge are touched upon—mathematics, natural sciences, foreign languages, etc.—and practical wisdom in regard to the treatment of money, hygiene, and similar problems.

Yin Chih Wen, The Tract of the Quiet Way. With Extracts from the Chinese commentary. Translated by Teitaro Suzuki and Dr. Paul Carus. 1906. Pp. 48. 25c net.

This is a collection of moral injunctions which, among the Chinese is second perhaps only to the Kan-Ying P'ien in popularity, and yet so far as is known to the publishers this is the first translation that has been made into any Occidental language. It is now issued as a companion to the T'ai-Shang Kan-Ying P'ien, although it does not contain either a facsimile of the text or its verbatim translation. The original consists of the short tract itself which is here presented, of glosses added by commentators, which form a larger part of the book, and finally a number of stories similar to those appended to the Kan-Ying P'ien, which last, however, it has not seemed worth while to include in this version. The translator's notes are of value in justifying certain readings and explaining allusions, and the book is provided with an index. The frontispiece, an artistic outline drawing by Shen Chin-Ching, represents Wen Ch'ang, one of the highest divinities of China, revealing himself to the author of the tract.

The motive of the tract is that of practical morality. The maxims give definite instructions in regard to details of man's relation to society, besides more general commands of universal ethical significance, such as "Live in concord," "Forgive malice," and "Do not assert with your mouth what your heart denies."

THE OPEN COURT PUBLISHING CO., 1322 Wabash Ave., Chicago

THE MONIST

A QUARTERLY MAGAZINE

Devoted to the Philosophy of Science

PAUL CARUS
EDITOR

ASSOCIATES { E. C. HEGELER
MARY CARUS

"The Monist" also Discusses the Fundamental Problems of Philosophy in their Relations to all the Practical Religious, Ethical, and Sociological Questions of the day.

TERMS OF SUBSCRIPTION

The United States, Canada and Mexico, yearly, $2.00; single copies, 60 cents. In England and the U. P. U., yearly, 9s. 6d.; single number, 2s. 6d.

Bound Volumes I–XVI in half leather, each $3.00 (12s.). Postage, 1s. extra to countries in the U. P. U. Binding cases for back volumes, same style, postpaid, 75c. (3s. 6d.). Unbound back numbers, $2.00 per volume.

A sixteen years Index of "The Monist" is now in preparation. Advance orders for said Index will be carefully filed for future execution.

TESTIMONIALS FROM THE READERS OF "THE MONIST"

"I do not believe any periodical in the world is doing such service to civilization and to this country that no one precisely renders than 'The Monist'." — CHARLES PEIRCE, Milford, Penn.

"Its great breadth and liberality, its high class of papers, and its able and scholarly reviews, are among its noteworthy features."— LESTER F. WARD, Smithsonian Institution, Washington, D. C.

"I read 'The Monist' because it stands for something, because it gives me the thoughts of contemporary leaders, and because it is always on the side of sound scholarship."—DAVID EUGENE SMITH, PH. D., Professor of Mathematics in Teachers' College, Columbia University, New York City.

"Among the periodicals of a higher class, which I have been receiving for some years past, there is none that I read more regularly than 'The Monist'; and there is not a number in which I have not found some articles of special suggestiveness. I have been so impressed with the value of the periodical that I recommended last year the purchase of a complete set for the library of our university." —J. CLARK, MURRAY, LL. D., Professor of Philosophy in McGill University, Montreal, Canada.

"I do not think that any Journal in the world can rival 'The Monist,' and scarcely any other country but America can ever produce a journal like this, scientific and still all-comprising, free-thinking and still never vague, but exact."—DR. HUBERT SCHLEIDEN, Hanover, Germany.

"I am in possession of the entire series of these repositories of select lore. Without intermission these many years they arrived at my 'Wild West' home, expanding my thought and deepening my sympathies with the great scientific movement." — DR. EDMUND MONTGOMERY Hempstead, Texas.

"'The Monist' is certainly performing an important service. I always read the Journal with interest and profit. It would be difficult to exaggerate the value of your journals and other publications for the advancement and diffusion of philosophy and science."—Prof. J. MCKEEN CATTELL, Professor of Psychology in Columbia University, New York.

"I desire to state that there are found compiled in this journal three qualities which render it superior to most other American and European reviews, namely: (1) The unlimited liberty of discussion and of thought in every branch of science pervading its pages; (2) The varied character of the articles which are published in every single number of it; and (3) The names of its illustrious contributors and collaborators from every part of the world." — G. SERGI, Professor of Anthropology in the University of Rome, Italy.

Librarians, book collectors, and students desiring to secure the back numbers of "The Monist" can obtain exceptionally favorable terms by addressing the publishers at once, as a limited number of sets in excess of requirements are to be disposed of for want of storage facilities. SPECIMEN COPIES ON APPLICATION.

Zarathushtra, Philo, the Achaemenids, and Israel

Being a Treatise upon the Antiquity and Influence of the Avesta, for the most part delivered as University Lectures.

By Dr. Lawrence H. Mills, Professor of Zend Philology in the University of Oxford, Translator of the Thirty-first Volume of the Sacred Books of the East, Author of the Five Zarathushtrian Gathas, etc. Part I.—Zarathushtra and the Greeks. Part II.—Zarathushtra, the Achaemenids and Israel. Composed at the request of the Trustees of the Sir J. Jejeebhoy Translation Fund of Bombay. 8vo. Pp. xiii, 208; xiv, 252, two parts in one volume, cloth, gilt top, $4.00 net.

Shortly before the death of Professor James Darmesteter, of Paris, the great authority on the "Zend-Avesta," he surprised the general public by changing his views concerning the antiquity of the Zoroastrian literature, maintaining that the "Gathas" were largely influenced by the writings of Philo, and were written about the beginning of the Christian era. This change of view on his part led the Parsees of India to engage Dr. Mills to write a book upon the great antiquity of the "Avesta." After several years of continuous devotion to the subject, the present volume is put forth as the result, and it amply meets all expectations. The antiquity of the Zoroastrian literature is successfully maintained, and in such a manner that ordinary readers can appreciate the argument.

"The Avesta in no sense depends upon the Jewish Greeks. On the contrary, it was Philo who was in debt to it. He drank in his Iranian lore from the pages of his exilic Bible, or from the Bible-books which were then as yet detached, and which not only recorded Iranian edicts by Persian Kings, but were themselves half made up of Jewish-Persian history. Surely it is singular that so many of us who 'search the scriptures' should be unwilling to see the first facts which stare at us from its lines. The religion of those Persians, which saved our own from an absorption (in the Babylonian), is portrayed in full and brilliant colors in the Books of the Avesta, because the Avesta is only the expansion of the Religion of the sculptured edicts as modified. The very by-words, as we shall later see, are strikingly the same, and these inscriptions are those of the very men who wrote the Bible passages. This religion of the Restorers was beyond all question historically the first consistent form in which our own Eschatology appeared" (pt. i. pp. 206-207).

The conclusions come with great force in support of the genuineness and authenticity of the biblical references to Cyrus in the Old Testament. Students of the literature of the Captivity will find the volume invaluable. The facts now brought to light are such as the literary critics cannot afford to neglect.

The Open Court Publishing Co.

1322 Wabash Avenue, Chicago

VOL. XVIII. No. 2. APRIL, 1908.

THE MONIST

A QUARTERLY MAGAZINE

Devoted to the Philosophy of Science

Editor: Dr. Paul Carus. *Associates:* E. C. Hegeler, Mary Carus.

CONTENTS:

(For particulars see inside title-page.)

CHICAGO

THE OPEN COURT PUBLISHING CO.

Price, 60 cents; Yearly, $2.00

LONDON: Kegan Paul, Trench, Trübner & Co., Ltd.

In England and U. P. U., half a crown; Yearly, 9s 6d.

Entered as Second-Class Matter Oct. 10, 1890, at the Post Office at Chicago, Ill., under Act of March 3, 1879.

THE OPEN COURT

AN ILLUSTRATED MONTHLY MAGAZINE

Devoted to the Science of Religion, the Religion of Science, and the Extension of the Religious Parliament Idea

Editor: DR. PAUL CARUS. Associates: { E. C. HEGELER / MARY CARUS.

An Unpartisan Organ of Religious, Ethical, Philosophical and Scientific Expression, Contributed to by the Leaders of Science in all Countries, and by the Leaders of Religion of all Denominations.

TERMS OF SUBSCRIPTION

Postpaid, $1.00 a year for the U. S. and Mexico; Canada, $1.25; for countries in the Universal Postal Union, 5s. 6d. Single copies, 10 cents (6d.).

Prices of Back Numbers in sets or volumes will be supplied on request.

Binding cases for back volumes, in cloth, with gilt side and back lettering, postpaid, 75 cents (3s. 6d.) each.

Some idea of the character of the work which "The Open Court" has been doing, and of the high standing of its contributors, may be gained by reference to the twenty years Index, which will be sent on request. Price, 15 cents.

Back numbers, unless out of print, will be supplied, postpaid, at 25 cents each.

TESTIMONIALS FROM READERS OF "THE OPEN COURT"

"I regard 'The Open Court' and 'The Monist' as the two best American philosophical magazines that we have."—Dr. Lester F. Ward, Smithsonian Institution, Washington, D. C.

"The statement of the principles of 'The Open Court' (in No. 524) as the organ of the Religious Parliament idea is so admirable, that, speaking from the point of view of an Orthodox Christian, I wish the statement might somehow be put into the hands of every clergyman and religious leader."—Elias Compton, Dean of the University of Wooster, Wooster, Ohio.

"In my judgment your magazine is an extremely original and interesting institution, conducted with uncommon skill, and always offering to its readers a great deal of interesting material. The union of discussions of religious, philosophical and scientific questions appears to me to be felicitous."—August Weismann, Professor in the University of Freiburg, Germany.

"I follow the work of your magazine with the liveliest sympathy. May its endeavors be crowned with future success."—Prof. Rudolf Eucken, Professor of Philosophy in the University of Jena, Germany.

"It is always a pleasure to me to receive 'The Open Court.' It is in my opinion a magazine of great value. In its brief but solid papers it throws light upon many interesting questions."—Harold Hoeffding, Professor in the University of Copenhagen.

"'The Open Court' is one of the most interesting and instructive publications of the kind that I receive and read. It is an exponent of modern science and philosophy, and has a mission of culture and education peculiarly its own."—Dr. Edward Brooks, Superintendent of Public Schools, Philadelphia, Penn.

THE OPEN COURT PUBLISHING CO.

378-388 Wabash Avenue P. O. Drawer F Chicago, Ill.

VOL. XVIII. APRIL, 1908. NO. 2.

THE MONIST

THE TRANSMISSION OF LIFE THROUGH THE UNIVERSE.*

ALREADY in their earliest reflections about the nature of organic life, men must have discovered, that every living being is once generated and after a longer or shorter lifetime dies. Somewhat later, but even this in a comparatively early stage, the empirical knowledge must have been reached that organisms of one species only produce organisms of the same species, or, as we say, "the species are stable." At this period, therefore, all the different species were believed to have left the hand of the Creator in their present form. This conception still conforms perhaps with the general, so to speak, orthodox opinion.

The doctrine has often been called the "Linnæan" because Linnæus in the fifth edition of his *Genera Plantanum* strictly adheres to the same: "Species tot sunt, quot diversas formas ab initio produxit Infinitum Ens, quæ deinde formæ secundum generationis inditas leges produxere plures, at sibi semper similes, ut species nunc nobis non sint plures quam fuerunt ab initio." In the sixth edition, however, Linnæus is evolutionist, as after the words *"diversas formas"* he has added *"et constantes"* and after *"produxere plures"* has replaced the rest of the sentence by *"sibi similes quam quae fuere ab initio."* Linnæus was followed by Lamarck and Oken, but Cuvier through his authority restored the old opinion and assumed that the species known

* Translated from the Swedish by J. E. Fries.

from earlier geological epochs but now extinct had been annihilated by some of nature's revolutions, whereupon new species were produced by new acts of creation.

A great change in the general conception, however, has quickly taken place during the last decades through the widespread study of the theory of evolution, especially after Darwin developed the same in his pioneer works.

According to this theory, the species in the course of time adapt themselves to exterior conditions, and by and by the alteration becomes so great that a new species may be said to have developed from the old. Lately this theory has been amended through the work of de Vries even so far that we now say that evolution occasionally takes a leap so that an old species directly produces a new. This is called the "theory of mutation."

Therefore we now assume that every organism that we observe has descended from other widely different beings, of which we find remains and traces in geological sediments deposited millions and millions of years ago. It might accordingly be possible that every creature endowed with life to-day has developed from one extremely simple organism, but it remains to demonstrate how this one has come into existence.

The prevailing opinion is probably the one already cherished by the ancients that the lowest organisms are generated without seed. It was observed how certain low creatures, maggots, etc., grow in decaying meat, as Ovid tells us in his Bucolics. This idea obtained until the seventeenth century but was then disproved by numerous experiments conducted by scientists such as Swammerdam and Leuwenhoek. But again this theory of spontaneous generation blazed into new life after the discovery of infusoria or the small organisms which appear in decoctions and infusions apparently out of lifeless matter. Spallanzani however proved (1777) that if the infusoria as well

as the vessel and the air enclosing the same were heated sufficiently to kill all germs then the infusoria became sterile, i. e., no more life developed. The method of preparing conserves is based on this discovery. Nevertheless the argument was brought up that the heat had so transformed the air as to make it unfit for the production of life. But even this last refuge was rendered impossible when Chevreul, Pasteur and Tyndall in the years 1860-1880 demonstrated that air from which all germs had been removed even through other means than heat, for instance by filtering, became unable to develop infusoria. Especially has Pasteur, whose methods of sterilizing are in daily use in the bacteriological laboratories, forced us to conclude that germs are necessary for the production of life.

In spite thereof, prominent scientists time and again come forward with pen in hand endeavoring to prove that we must assume the possibility of spontaneous generation. In these attempts they do not employ the exact methods of natural science but rather a philosophical mode of thinking. "Life," they tell us, "must once have come into existence, and we are therefore forced to the conclusion that spontaneous generation at some specific time has taken place although it does not occur under present conditions." Much attention was aroused when the great English physiologist Huxley believed himself to have found in some silt gathered from the bottom of the deep seas an albuminous body whose origin he called *Bathybius Haeckeli* in honor of the ardent German Darwinist Haeckel. For some time it was thought that this *Bathybius* (deep-organism) constituted the "primitive slime" of organic substance, the fulfilment of Oken's dreams, from which all organisms might be considered to have originated. Closer investigations, however, by the chemist Buchanan have demonstrated that this "primitive slime" consisted only of gypsum precipitated by the presence of spirits.

Some very fantastic explanations were now resorted to. It was said, for instance, that life possibly could originate from the inner glowing mass of the earth. At a high temperature perhaps organic compounds (cyanates and their derivatives) were formed which might be possessed of life. There seems, however, to be little reason for considering these speculations, before they have at least obtained some experimental foundation.

In this connection I cannot deny myself the pleasure of pointing out that at times external conditions may have been more favorable for the production of new species than they are at present. The famous physiologist Loeb in San Francisco has shown that the hybrid of holothurian and a starfish, which cannot develop in ordinary seawater, will come to life if a certain amount of carbonic acid is added to the solution. He therefore remarked that in geological epochs, when the air was highly carbonated as during periods of marked volcanic vivacity, hybrids may have come forth in vastly greater number than now. These hybrids may possibly have propagated, and this would account for the fact that certain geological eras are conspicuous for their magnificent production of new species while others, so to speak, appear to have been comparatively sterile. But the leap from hybrid to self-generation is far too great to make the discovery by Loeb an evidence of importance in favor of the theory that self-generation might have occurred during earlier geological epochs when the external conditions differed from the present.

We must therefore take sides with the great physicist Lord Kelvin when he passes judgment on this gospel in the following words: "A very ancient speculation, still clung to by many naturalists, supposes that under meteorological conditions very different from the present, dead matter may have run together or crystallized or fermented into 'germs of life' or 'organic cells' or 'protoplasm.' But

science brings a vast mass of conducive evidence against this hypothesis of spontaneous generation, as you have heard from my predecessor in the Presidential chair. Dead matter cannot become alive without coming under influence of matter previously alive. This seems to me as sure a teaching of science as the law of gravitation."

Although this last assertion may seem somewhat exaggerated it shows how necessary some investigators have found it to look for some other explanation of the problem. We have in fact another speculation in the so-called "Panspermy," a doctrine according to which germs of life are constantly moving about throughout space, meeting the planets and filling their surface with life as soon as the conditions for organic existence are fulfilled.

The origin of this idea may probably be dated long ago. Plain utterances in this direction were made (1821) by Sales-Cuyon de Montlivault in France, who assumed that germs from the moon brought into existence the first life on the surface of our earth. A German physician, Dr. H. E. Richter, offered (1865) panspermy as an amendment to Darwin's theory. Inspired by Flammarion's theory of numerous inhabited worlds, Richter asserts that seeds were brought to this earth from some other world that was in the life-bearing stage. He points out that carbon, which he holds to be of organic origin, has been found in meteorites, which, as is well known, have orbits similar to those of the comets. The organic origin of this carbon, however, is an hypothesis entirely unsupported by science, since meteoritic carbon never has shown trace of organic structure and carbon may as well be derived from inorganic matter; such for instance is found in the sun. More adventurous yet is his suggestion that organisms floating at great height in the atmosphere might be attracted by some passing meteorite and be carried out into space and transported to other celestial bodies. As a matter of fact

the surface of the meteorite is fused in its passage through the atmosphere and any germ that might possibly be attracted by it would necessarily be killed. And if, in spite of all, a meteorite should carry germ cells on its surface, these would inevitably be burned to ashes when it fell through the atmosphere of this or any other planet.

But on one point we must agree with Richter; there is perfect logic in his sentence: "The cosmic space embraces maturing, ripened and dying globes, where ripened stands for those that are ready to shelter living organisms. We therefore consider organic life in the universe to be eternal. It has existed in eternity, and has unceasingly propagated in the form of living organisms, cells or individuals composed of cells." As men formerly speculated over the origin of matter, but have given this up since experience has shown that matter is indestructible and only changes its form, and as we for analogous reasons never raise the question from where the energy of motion has come, similarly why should we not be able to familiarize ourselves with the idea that life is eternal and that therefore it is useless to search for its beginning.

The thoughts of Richter were accepted by the famous botanist Ferdinand Kohn in a popular lecture 1872. Perhaps the best-known of similar utterances is that of the great physicist Sir William Thomson, the late Lord Kelvin, who in his presidential address to the British Association in Edinburg, 1871, said:

"When two great masses come into collision in space, it is certain that a larger part of each is melted; but it seems also quite certain that in many cases a large quantity of debris must be shot forth in all directions, much of which may have suffered no greater violence than individual pieces of rock experience in a landslide or in blasting by gunpowder. Should this earth come into collision with another body comparable in dimensions to itself, at a time

when it is still clothed as at present with vegetation, many great and small fragments carrying germs and living plants and animals would undoubtedly be scattered through space. Hence and because we all confidently believe that there are at present, and have been from time immemorial, many worlds of life besides our own, we must regard it as probable in the highest degree that there are countless germ-bearing meteoric stones moving through space. If at the present instant no life existed upon this earth, it might lead to its becoming covered with vegetation. I am fully conscious of the many scientific objections which may be urged against this hypothesis, and I have already taxed your patience too severely to allow me to think of discussing any of them on the present occasion; all I can say is that I believe them all to be answerable."

Unfortunately, we cannot share in the optimism of Lord Kelvin on this point. To begin with it is doubtful if living organisms would survive the violent impact at the collision of two celestial bodies. We further know that the whole surface of a meteorite when falling upon the earth becomes heated to incandescence through friction against the air so that all adhering seeds must lose their power of germination. Plants grow almost exclusively in loose soil, and if a lump of earth were to fall through the atmosphere, it would undoubtedly, because of the resistance of the air, break into pieces each of which would become a shooting star and reach the earth only in the form of ashes. Another difficulty is that such collisions which we believe are indicated by the blazing up of new stars on the firmament are of exceedingly rare occurrence so that the chances are very small that living germs should be brought in this way to a certain spot such as our earth.

The whole theory, however, has entered into a far more favorable aspect with our growing knowledge of "radiation-force." Maxwell and Bartoli have calculated that

very small bodies of such size that they hardly become visible under our strongest microscopes are repelled by radiation, for instance, from the sun, so that this force may exceed the solar gravity. This theoretical conclusion has been verified through experiments by the Russian physicist Lebedew, and the Ameircan scientists Nichols and Hull.

The sun's radiation-force, according to calculations by the German Professor Schwarzschild, would show its influence best on bodies which if globe-shaped have a diameter of 0.16 micron. (One micron equals one thousandth part of one millimeter and is a unit frequently used in microscopy; the smallest visible particles have a diameter of about 0.2 μ.) The first question is: Do germs really exist of such infinitesimal size? To this the botanists answer that the spores of many bacteria measure 0.3μ to 0.2μ and that undoubtedly even smaller exist although we are unable to detect them under the microscope. Such no doubt cause rabies with dogs, the foot and mouth disease in cattle, and the mosaic plague on tobacco leaves, common in Indo-China and sometimes observed in Europe, and all sicknesses due to bacteria, but for which the corresponding bacilli have never been discovered, probably because of their minuteness and consequent invisibility under the microscope.

It is then most probable that living organisms exist so minute that the radiation-force of the sun would expel them out into space, where they might fecundate planets that offered them a favorable place for development. To begin with let us estimate what would happen if such a micro-organism, separated from the earth were driven out in space by the sun's radiation. Passing the orbits of Mars, the small planets, the outer planets and finally the last station in our solar system, the Neptune-orbit, it would start out in infinite space towards other solar systems. There is no difficulty in calculating the time required for

this journey by the swiftest of the small particles. Their specific weight may be considered as that of water which nearly corresponds to actuality; they will then reach the path of Mars inside of 3 weeks, that of Jupiter in 11 weeks and that of Neptune after 19 months. The nearest solar system, α Centauri, would be reached after 9000 years. (These calculations are based on the assumption that the radiation-force is four times greater than gravity at the sun, an approximate value according to Schwartzschild's calculations).

During the time required to reach any planet in our solar system, the germs of life certainly might retain their power of germination. Somewhat more disadvantageous are the conditions for the preservation of life during the passage to the nearest solar system. But we know that the suns are moving relatively to each other, so that the distance between them varies. We are able to figure out that during the course of one million years some star probably has been about five times as close to us as our nearest neighbor at present. When we estimate that life has inhabited the earth at least 100 million years, we must admit that it is of little importance if a planet should have to wait for the appearance of life a couple of millions of years after it has become ready to receive the same. In this way we reduce the time for the journey to the nearest star to 1800 years. One might doubt whether spores of bacteria or germs in general retain their latent life for such a period. It has been claimed that grains found in Egyptian sepulchres have shown capability of growth. But the sober critic has demonstrated that these statements are exceedingly questionable. Recently a French scientist, Boudin, stated that he had found spores of several kinds of bacteria in a Roman grave in Troussepoil (Vendee, France) which undoubtedly have retained their germinative power during 1800 years. This assertion, at any rate, does not seem un-

reasonable. Germs of bacteria, therefore, might possibly keep their life-bearing quality during the transportation from one planetary system to another.

On their way from our globe, the germs of life in question would be exposed to strong sunlight during about one month, and we know that the most refractable sunrays kill bacteria and their spores within a comparatively short time. As the experiments have been carried out however the spores have generally been placed on some moistened surface. (Marshall Ward's experiments.) These conditions by no means apply to spores moving in the interplanetary spaces. Furthermore, it has been shown by Roux, that the splenic fever spores, which are quickly killed by sunlight under free access of air are not affected at all in vacuum. Certain spores again suffer little if any harm from light. All the botanists that I have consulted on this point agree that there is no evidence to the end that spores traveling through space would necessarily be killed by sunlight.

It might further be argued that the spores, during by far the largest part of their journey are exposed to a cold that they might not endure. When the spores pass the orbit of Neptune, their temperature has gone down to —220° C. and still further out it is perhaps even lower. During some recent experiments at the Jenner Institute in London, spores of bacteria were kept for 20 hours at a temperature of —252° C. in liquid hydrogen gas. Their power of germination was not destroyed. Professor Macfayden in London went further still and showed that microorganisms kept for six months at a temperature of —200° C. in liquid air still would germinate. At my latest visit in London, I was told that such trials had been protracted for even longer periods with the same result.

On the contrary, it is not improbable that the power of germination will last vastly longer at temperatures lower than those common on the earth. The loss of this power

is no doubt caused by some chemical process and nearly all such actions proceed enormously slower at lower than at higher temperatures. It seems, therefore, not unlikely that the extreme cold in the interstellar space preserves, so to speak, the germs of life so as to allow a far more protracted transportation than one might judge possible from their behavior at ordinary temperatures.

We see then that the spores of the smallest earthly organisms, if once separated from our globe, would quickly be dispersed throughout the universe as seeds are scattered over a field. But now the question arises: How will they be able to leave the earth against the force of gravity? Of course such tiny and light bodies would follow the currents of air. A small particle of rain, one-fiftieth part of a millimeter in diameter falls four centimeters per second at ordinary atmospheric pressure. Hence it is easily calculated that a spore of bacteria 0.16 micron in diameter would fall only 83 meters in one year. Evidently such small particles follow the currents in the atmosphere even out into the most rarified air. By a current of two meters velocity per second they would be carried to a height where the barometer would show only 0.001 millimeter, or a height of about 100 kilometers. But by the currents in the air they could never be expelled out of the atmosphere.

In order to lift them to greater heights, we must resort to other forces and fortunately we know that electricity will help us out of almost any difficulty. On such great heights as 100 kilometers the northern lights display their resplendent radiance. We believe nowadays that the northern lights are caused by discharges from negative electricity brought with great quantities of dust from the sun. The atmosphere is there as if saturated with negative electricity. If therefore the spore in question receives a negative charge from the sundust, it might by its charged neighbor be driven out into the ether sea.

We assume now that electrical charge as well as matter is not divisible *in infinitum,* but that there exists a minimum charge which has been determined to be 5×10^{-10} electrostatic units.

It is not difficult to calculate how strong the electrical field must be that will expel such a charged spore against the force of gravity. A field of 150 volts per meter will suffice for this purpose. Fields of this strength are often, almost normally, observed at the surface of the earth in clear air. The electrical field in the region of the northern lights is in all probability much stronger, and is therefore no doubt able to expel the electrically charged spores when they are carried to this region by currents of air.

It is therefore probable that seeds of the lowest organisms we know are continually being scattered out in space from the earth and from other planets inhabited by life. But like germs in general, by far the greater portion of these will perish in the cold infinite space, a small number, however, may fall on other spheres to bestow upon them, if their conditions are favorable, the gift of life. Sometimes this may not be the case; sometimes again the seeds will meet an eager soil. And even if a few millions of years should elapse from the time when a planet is ready to receive life until the day when the first seed reaches its soil, sprouts, and takes it into possession for the use of organic life, how insignificant is this delay compared with the era during which life will blossom on the planet.

The tiny seeds expelled in this way from the homes of their parents may either travel isolated through space and, as outlined above, reach outer planets or systems of planets centered around other stars, or they might meet bigger particles rushing in towards the sun. In that part of the zodiacal light which is called in German *Gegenschein* and is regularly observed in the tropics and occasionally at our latitude in the part of the sky opposite the sun, we behold,

according to the astronomers, streams of fine dust swiftly falling into the sun as gravity commands. Suppose now that a spore 0.16 micron in diameter meets such a dust particle 1000 times greater, that is 1.6 micron in diameter, and adheres to its surface, then the spore will be carried in towards the sun, thereby crossing the orbits of the inner planets, and might fall into their atmosphere. It does not take these dust particles a long time to pass from one planetary orbit to another. Assuming their initial velocity zero at Neptune (they might then originate from one of Neptune's moons, as Neptune, Uranus, Saturn and Jupiter themselves probably as yet have not cooled off sufficiently to shelter life) they would reach Uranus's orbit in 21 and that of Mercury in 29 years. Under similar conditions, such particles would cover the distance between the orbits of Uranus and Saturn in 12 years, between Saturn and Jupiter in 4 years, between Jupiter and Mars in 2 years, between Mars and the earth in 84 days, between the earth and Venus in 40 days and between Venus and Mercury in 28 days.

It becomes evident from these figures that the dust particles with their adherent spores might fall 10 to 20 times slower without danger of the spores losing their germinating power. In other words, if the spores adhere to particles so tiny that their weight to 90 or 95% were balanced by the sun's radiation force, they might yet within a comparatively short time fall into the atmosphere of the inner planets but with a reasonable velocity, of say a few kilometers per second. It is easy to calculate that if such a particle were brought to a standstill in one second, its rise in temperature would only amount to 100° C. above that of the surrounding air because of the strong radiation. Such temperatures the spores of bacteria easily endure for even much longer periods than a second without jeopardizing their life. Once arrested the particle with its ad-

hering germ and with or without the help of air currents would slowly sink to the surface of the new planet.

In this way life would quickly be dispersed from its home within a planetary system to other places in the same system offering favorable conditions for its existence.

Some of the germs which were not caught by such dust particles would continue their journey towards other solar systems, where they would be arrested by the radiation force from the new suns. They cannot go further than to a point where the opposing radiation pressure equals that at their starting point. Consequently germs from the earth which lies five times nearer our sun than Jupiter would approach another sun to a point five times nearer that sun than germs from Jupiter would.

In the neighborhood of the suns, where the germs stop on account of the radiation pressure and return to the inter solar spaces, there will necessarily occur a great accumulation of such seeds. The planets gravitating around these suns have better chances, then, to meet them here than if they were scattered somewhere else in space. The germs have also lost the great velocities with which they traversed the intersolar distances, and they will therefore not be heated up by falling into a planet's atmosphere to such an extent as otherwise would be the case.

In this neighborhood of the suns, we must also find a concentration of the above mentioned dust particles of a weight a little less than counter-balanced by the radiation-pressure and therefore moving towards the sun. There are comparatively good chances then that the germs here will be attracted to such particles and therefore hindered from returning to space and instead brought in towards planets nearer the suns.

In this way life may have been transplanted since eternity from solar system to solar system and from planet to planet within the same system. But as the billions of pollen

atoms that the winds will scatter in all directions from a large tree like a pine, for instance, on an average give life only to one new tree, so probably only one out of billions or perhaps trillions of germs that are dispersed from a planet by the radiation force throughout the universe, will fall on a planet not yet inhabited by life and there give birth to an infinite number of living organisms.

Finally we find according to this version of the theory of panspermy that all living beings in the universe are kindred and consist of cells built up mainly of carbon, hydrogen, oxygen and nitrogen. The fancied existence then of other worlds inhabited by beings in the organisms of which the carbon for instance is substituted by silicon or titanium seems rather dubious. Life on other inhabited worlds is probably evolving in forms very similar to those on the earth.

Further we draw the conclusion that life always has to commence from its lowest forms just as every individual, however highly developed he may be, must pass all stages of evolution, from the first simple cell.

All these conclusions harmonize beautifully with the general characteristics of life on the earth, and it cannot be denied that this form of the doctrine of panspermy possesses that degree of coherence which is the best criterion for the probability of a cosmogonic hypothesis.

There are very small chances for a demonstration of this theory through observation of the germs falling down through the atmosphere. The number of germs arriving on the earth each year, is probably extremely small. In addition, they are no doubt very similar to those of earthly origin which the winds carry in enormous quantities, and therefore, even if they should be found by scientists, their "celestial" birth would be difficult to prove.

S. ARRHENIUS.

UNIVERSITY OF STOCKHOLM, SWEDEN.

THE EVOLUTION OF LIFE OR NATURAL SELECTION IN INORGANIC MATTER.

NOT once nor twice but many times indeed is it that the great question has been raised What life is and how it has arisen. Seldom before has it been so much before the minds of men. This strange power that pervades certain forms of matter; animates, moves, grows, reproduces itself and dies; this ever changing, never ending cycle of events; the phenomenon we call life. What is it? Not one of us can say. If we give a hint that we have tried to solve the problem, people think that we mean we have also accomplished its solution.

But the great problem, though presented in a new light, still leaves us where we were: asking indeed once more; whence have we all come and whither are we all going? It is the question of all questions which ever present themselves to thinking minds. To Carlyle indeed, it was the one great question of his life, ever present to him, as really and as intensely as the Divine presence was to such a man as Newman. This faculty of perception is regarded as the striking feature that elevates the leaders of men at all times and in all places, to the plane of something higher than the common level. Commonplace folk feel it dimly but seldom attain to it. Now not even commonplace men, but men of science generally, think little of it. They merely look at phenomena and move straight on. It does not concern the majority; nor even the majority of

the minority, who may devote themselves to intellectual pursuits.

Biologists, chemists, physicists, nay even the positive philosophers like Comte, refuse to think of it. It is too distant, too remote a question to concern us in the affairs of every-day life. We may pass through it heedless of its meaning; we may move on adjusting ourselves to that environment alone which has been laid out for us; acquaint ourselves with every detail in the particular sphere or department in which by chance we have been placed; and like passengers from Euston to Holyhead, provided we are not molested in our own compartment, ask no questions till we get to the other end. This is the duty of the individual: it is clearly also that of a tram horse. Though it may add to the efficiency of both it speaks volumes for the absence of intelligence in either. The man who ignores it may be happy and contented. The man who does not may be happy or unhappy as the case may be, but he is never commonplace or dull. He finds in life a real purpose: in his every act a real meaning. Such an one, view him as we may, lives on a higher plane, than the man in Cornhill or Piccadilly may attain to; he is a philosopher and in a truer sense a man. He has an acquaintance with the higher meaning of his "sojourn in this strange land," and he places himself in the position of one who has much to hope for, and may aspire to something better.

Now this problem of life can be presented in many ways. It can be confined within the narrow limits of pure science, or it may expand into the great problem of reality in which alone its true meaning can be found. It admits of no interpretation if we view it from a single point of view alone.

It will be found well to distinguish between the scientific and the philosophic attitudes, and yet at the same time

to bear in mind that neither will or can afford a true solution without the other.

Let us for the present however put to one side the deeper and more difficult question which philosophy presents; and let us ask ourselves, what is it that science has to tell us? The most it can do is to show us that there is, or has been, a development, gradual or spontaneous, of living from apparently not living matter. It can give us in the present state of knowledge no clue as to its real nature nor as to its real origin. For even if such development were established as a fact,—and science does not claim that it has been so established, it would only tend to strengthen our belief in the process of evolution; and lead us to infer that there are vital processes in the apparently inert types of inorganic matter. The theory which it has been my endeavor for some time past to put forward is that there is in this so-called dead, inert, inactive, inorganic matter a process not unlike that of natural selection or survival of the best adapted types, which in the long run find their level in the adjustment or evolution of inorganic as well as of organic matter. There are various types of inorganic matter; call them species of matter if we will. The doctrine of the origin of species can apply equally to these as the means of sifting out the potential types which are best suited to their environment. It is in truth the "law of higgledy-piggledy," as Adam Sedgwick, the geologist, described the theory of Darwin.

Living matter, as we know it, is but a species of matter which has been sifted out as the fittest to survive. In the infinite gradation from the most complex to the most simple we may perceive the same process in an ever simplifying degree. The fact of self-reproduction was an accident, and a happy accident in a particular type.

As we propose to show, Weismann's ***determinants***, and *biophores* are well within the limits of molecular dimen-

sions; a circumstance which leads us, apart from other considerations, to deduce that the atoms and molecules of the chemist and physicist are of the nature of living things. In the *Origin of Life* I have tried to emphasize this idea; that atoms and molecules have only a family likeness, so to speak, and that they can be said to be the same only in so far as their physical and chemical properties are concerned, but that as vital units they may differ considerably.

Indeed the chemist has no more reason to suppose that the atoms of oxygen are the same in all respects, than the zoologists would have that all horses, all dogs, or all cats are the same. The atoms of oxygen are all like each other in so far as they have the same physical and chemical properties. But they may differ from each other in other respects; just as all horses, all dogs or all cats resemble each other in certain respects and yet differ in others. Biophores are the smallest vital units that the biologist has hitherto assumed. They are invisible and, from what appears, of molecular dimensions. They are the germ plasm in the nucleus of the cell, possessed of a great variety of properties but at the most composed of but a small number of atoms and molecules.

In order therefore that the great variety of properties which they doubtless do possess may be explained, it seems necessary to attribute to inorganic matter some of the properties which they exhibit. And that by a slow process of evolution those which had the vital properties most marked, combined to form more complex aggregates, by a mere process of natural selection.

It is curious that this theory has never been put forward, at least to my own knowledge, by any biologist, but it seems not unlikely that the reason is, biologists have not realized how closely biology and physics have approached; or indeed in some respects have already overlapped.

Molecular physics will doubtless yet become a branch

of biology; and these vital properties of atoms will require investigation as much as those of grosser objects which the eye can see, if only with the most powerful microscopes. The limits of visibility have nothing whatsoever to do with the limits of vitality; and the fundamental problems of biology, like those of physics and chemistry, are necessarily relegated to the invisible, but not relegated there because beyond the limits of speculation or experiment. "Formidable though the evidence for organic evolution be, and finally though the belief in it has been established by the work of the past half century, it would be idle to deny that there is yet difficulty enough in explaining many of the facts of animal and vegetable life."*

This difficulty is to be met with, I think, not merely in explaining so complex an organ as the eye by natural selection; but in explaining also how the germ plasm from which this complex organ was evolved, could consist of only a comparatively small number of molecules. The biophores, therefore, are really nothing more than big molecules or aggregates of molecules. And I am loth to think it idle to ignore that it is in the atoms and molecules of gross matter that we should seek the simpler processes of vitality and the potential properties of life.

Eminent authorities there are, even at the present day, who maintain that natural selection in organic evolution alone cannot account for the mental and moral qualities of man. Nor do I think it really can. The properties of the most complex kind should be traced to the potential qualities of inert matter, to the attributes of the atom itself; or even to those of which the atom is composed, the electron. Although this is the smallest that physical science has yet reached, there is no reason whatsoever to suppose that it is the limit; nay, rather is it most likely that the electron in turn is a highly complex structure, forsooth a

* *Organic Evoluton* by Dr. C. W. Saleeby.

universe in itself, differing from ours only in its order of magnitude. And so on *ad infinitum*. There indeed lies some of the real mystery of the varied attributes of life. In that indefinite, innumerable variety of minor combination, of which atoms in their ultimate nature really admit, is to be found, I think, the source and quality of our being.

There is in matter, I conceive, a power, if we may call it so, which under given conditions would enable it to spring forth into the activity of life. One atom out of millions may possess the property in a sufficiently marked degree to give rise in combination with another such atom or atoms of other substances, to the attributes of more developed life, until by some strange admixture out of countless failures the life we recognize as life to-day becomes at length supreme.

Students of Leibnitz will bear in mind how admirably his theory of monads may be made to fit in with this conception. Leibnitz regarded the atoms as mere points without extension in space; but endowed with the properties of mind. Monads differing in the degree or intensity of this consiousness: from the consciousness of a man, a dog, a fish, a plant, down to that of an atom. Our point is that there has been natural selection amongst these monads or atoms; and that the more complex forms of consciousness have been evolved by this same principle. These monads which have not so developed, constitute the vast majority of the failures of inorganic matter.

How is it, one may ask, that we have never seen such development take place? How is it, it may be replied, that we cannot see the evolution of man from lower forms? The theory of natural selection as applied to this monadology is, I believe, the one fittest to survive; to survive not alone because of its scientific value, which seems to me to be unquestionable, but because also of the way in which it

bridges over the gulf between living and apparently dead substance, as well as that between matter and mind.

Let us turn our attention then to this doctrine of monads and examine what it means. It is not a theory of *life-stuff* and *mind-stuff* as ordinarily understood, but of natural selection in the elements of that stuff itself. Clifford's theory of *mind-stuff* that all matter possesses a dim elementary type of consciousness, and that all higher forms of consciousness are merely complex combinations of these; must not be confused with Leibnitz's theory of monads, the units of which differ in their degree or intensity of consciousness, from the soul of man down to that of an atom. It has an advantage over that of Clifford's, because it gives the soul a chance and may account for the unifying principle in consciousness, which is the great objection to the former. Our theory then is that there has been evolution amongst these monads by a principle of natural selection, and that the human soul is merely an atom, a pointless atom if one may put it so, that has caught on and is able to regulate a host of others in the organism: much as a general can regulate an army or a captain navigate a ship.

This pointless conscious atom or monad, as it has been called, is as much matter as the ordinary atom of oxygen. It differs in degree from it as the soul of a Newton or a Shakespeare may differ from that of a Kaffir or a fool. But still the difference is only a matter of degree. There is no essential difference in substance and the two are ultimately of the same kind of being. It is handed on from generation to generation as biogen in germ plasm. It is here indeed, we find the doctrine of evolution lends a helping hand to the problem of the origin of life and of mind. It brings us also within reach of the physical nature of the biophores of Weismann and the gametes of Mendel, into which the great questions of heredity resolve.

It would be well then in considering the evolution of monads to clear our minds as to what biophores are and what gametes are, and how it can be shown to bear upon the theory of monads as we conceive it. What also are enantomorphs, biogen and bions?

We may begin by stating that the cell or unit of life recognized as such by the biologist to-day, consists of a nucleated mass of protoplasm; that is to say that it is a mere protoplasmic substance with a nucleus, and it may be added that there is a smaller speck near the nucleus called the centrosome, but it does not so much concern our present purpose. The centrosome may play a part in bringing about the *karyokinesis* or subdivision of the nucleus.

The latter consisting as it does of *chromotin* or stainable substance, of the nucleus, is made up of finer structures called the *chromosomes* which subdivide. Now Weismann assumes that these are made up of smaller invisible particles which he calls *determinants*, and these in turn of still smaller ones called biophores, the real germ plasm to which heredity is due. Objection has been taken to this assumption, but it seems nevertheless to be well founded. It is most likely that there is a series of nuclei one within the other, till we get to the molecules, atoms and electrons. As it is the nuclei in some cases are just within the limits of visibility; the determinants therefore are within the dimension of the wavelength of light, whilst the biophores approximate to that of molecules; they are therefore nothing more than big molecular groups.

Gametes are supposed to be the units by which according to Mendel hereditary qualities are handed down from generation to generation. Their presence constitutes indeed the principle on which our present theories of heredity are chiefly based.

In the *Origin of Life* we have regarded these gametes

and biophores as the n^{th} or ultimate nuclei and as units of the substance biogen. These units are supposed to be like the chemical elements, but of a less stable kind, consisting, in the astronomical analogue, of spiral nebulæ rather than solar systems.* The spiral nature of these biological atoms is what gives them their optical asymmetry. A point of considerable importance because life is never found apart from optical activity. These optically active atoms are called *enantiomorphs*. It must be noted however that in order that such atomic nebulæ should be possible it is necessary that the electrons of which the atoms are composed should in their turn be aggregates of smaller things, we have ventured to designate them *bions*. And so on *ad infinitum, ad infinitum*. We must never hope to reach the end in one scale of being any more than in the other. As Pascal has well said, "our being in space is a gulf between two infinities, as it is in time between two eternities." If there is nothing good or bad, and we may add true or false, neither is there anything great or small, but thinking makes it so. Our nature is a middle nature and our knowledge of nature merely relative. To dwell upon it is to expand our knowledge to two infinities, the infinitely great and the infinitely small.† This is merely physics; to go beyond it would be metaphysics, and metaphysics of a transcendental type.‡ We need go no further then, but rest content with that middle nature in which we have been placed. To seek the properties of life and matter and of mind and soul in that great scale of infinite gradations is legitimate indeed; to perceive the harmony of it all is both scientific and philosophic. We may ask once more then in this light of things, what life is and whence it has come. And our answer is that in its ultimate form it most probably

* See my paper on "Physics and Biology," *Knowledge*, March and April, 1907.

† *Knowledge, loc cit.*

‡ See "Haeckel and Haeckelism," *Oxford and Cambridge Review*, 1907.

always has been and always will be. The monads in their ultimate aspect are not necessarily chemical atoms nor even electrons, but in the limit the pointless units of which these are ultimately composed. The formation of cells in protoplasmic substance is the result of some such interaction, illustrated for instance by the action of radium and other salts on bouillon. These cells are not alive in the familiar sense of the word. In fact they do not show more than the rudiments of vitality, when the word is used in its more extended sense; but they help to illustrate the manner in which cellular bodies may be formed from protoplasmic substance: whilst given the dead protoplasm—which has not yet been synthesized in the laboratory, though there is little reason to suppose it will not be—and given also the vital units, not radium in this case but the vital substance itself biogen, the spontaneous appearance of organic life is conceivable on the lines worked out in the *Origin of Life*. That book has been criticized from many points of view. It is not my intention to dwell here upon those varied criticisms, most of which are really answered by anticipation in the book itself. Upon some future occasion it may be possible for me to enter fully into a discussion of those remarks. For the present my object is indeed to show the line of argument it was my desire to follow. To show on the one hand that metabolism is everywhere present; and on the other that it can be controlled by certain types of inorganic bodies; but most of all by the vital units which form the basis of all life.

Professor Windle, amongst others, objects that we are merely explaining one phenomenon by another, by something not less easy to comprehend. It may or may not be less easy, but it is at any rate a phenomenon of a simpler kind. And all science can ever hope to do is to reduce the complex to the simpler. The recognition of this ever simplifying scale, infinite as it may be, is perhaps not the least

striking feature in the explanation of nature. It is not like putting an elephant upon a tortoise, and leaving the tortoise to stand upon an elephant, for we put the tortoise upon something simpler than the elephant or itself. The ultimate basis is lost in the series, but the recognition of the series, or of the chain connecting the separate links, is as scientific a procedure, as a scientific procedure can be.

It may be said no doubt that the evidence does not prove conclusively that the view we take of the existence of these smaller units is correct. This may be true; we only claim that the facts have led us to postulate this, not merely as a working hypothesis, but even as the most probable solution.

To Herbert Spencer the recognition of this endless chain which loses itself in infinity, or the *unknowable,* as he unwisely called it, was a necessary postulate or axiom. It only required to be stated that it might be perceived as true.

His whole system of philosophy rested upon that idea; fabric in mid-air as it may seem to be, it represents what appears to be the most scientific and philosophic aspect of Nature.

But Spencer nevertheless did not enter into the question from exactly the same point of view. The theory of natural selection in inorganic matter, nor the applicability of monadology to it, does not appear to have entered his mind. The idea of *physiological units* elements of *life stuff* is however due to him. Our system is an attempt to show that materialism as understood now-a-days and idealism as understood by Leibnitz, though perhaps in a slightly modified form, are not merely not incompatible with one another, but that viewed from a higher standpoint polymism and monism are but different aspects of the same thing; for unity and plurality are everywhere conditions of reality.

The more closely we examine the nature of continuity the more clearly does it appear that it is everywhere of the nature of a plurality but that in the limit, in order that there should be such a thing as continuity, there is unity. This is illustrated in the case of space and time; it is also manifest in the case of motion and indeed in all instances of continuity in nature.

Now it is not always recognized in dealing with small physical quantities; for the physicist generally thinks of the smallest unit he has obtained, the electron, as the smallest in creation.

To my mind the idea seems, I shall not say absurd, but certainly narrow, and to put a limitation to what obviously has none. The assumption that we have realized the limit of smallness in the limits of experimental methods is certainly absurd. It must not however for a moment be supposed that we are thus rejecting the atomic constitution of nature; but merely emphasizing that atoms are merely lumps of smaller things, these may be elements of the ether, it matters not what, but doubtless in their turn aggregates of something else much smaller still, *ad infinitum*.

Here it will no doubt be pointed out that the principle of continuity when applied in this way is equivalent to the ancient maxim that *nature abhors a vacuum*. That is no doubt true. It all depends upon what is meant by a vacuum. The ancients did not mean the absence of chemical atoms, for they knew nothing about them; but the absence of all or any substance whatever. It is here I think those who have thought out the matter will find that the principle of continuity of substance as worked out by Leibnitz still holds good.

That great philosopher, mathematician, statesman and man of the world saw things in a true light. His perspective was not distorted by the refracting air of academic life. He lived in a purer and nobler atmosphere: indeed

some said he lived in an intellectual balloon, so wide was his view of the world. His knowledge was so varied, his correspondence with the learned in every land so great that he was said to be an academy in himself. There was some truth in the statement. He stood alone and yet worked in harmony with the world. Everywhere he left the impression of intellect and character, which as some of his contemporaries found to their discredit, would stand the test of time.

When we come to consider his theory of monads, we may apply to them the principle of natural selection, or the process of sifting out the best adapted types, instead of assuming the principle of pre-established harmony which he accepts because the theory of evolution would doubtless have been foreign to his mind.

Now in the light of these considerations, evolution on Darwinian lines, in inorganic matter, is as much a necessary fact as that in the organic. In truth, life exists as much in one as in the other and the difference is only a question of degree.

The anatomist and physiologist no doubt maintain that the properties we ascribe to monads are merely in the phronetal cells in the cortex of the brain; the *phronema* supposed to be the organ of thought. But this really does not affect the question. Not more so indeed than that the eye is the organ of vision, the ear the organ of hearing, or the nose the organ of smell. These bear the same relation to the conscious unit which we call the soul, that, to take an old analogy, a piano does to the player. The analogy is as good as it is ancient. When the mechanism of the piano is destroyed, or the ear injured, there is no further music, and though consciousness and its potential properties are there, they do not combine to produce the beautiful combinations of thought through the instrument of the piano and the brain. This is old, very old, but I

think not on that account less true; and it is the view now held by some of the most eminent psychologists, notably by Mr. William James.

The extraordinary innate qualities in the embryonic cell are as I think beyond all doubt clear to infra-molecular arrangements. It is for this amongst other reasons that I have applied the doctrine of natural selection to atoms. But it was more so on account of the psychological developments that I have found it still more imperative to assume the elements of mind in the ultimate nuclei; the monads of our being which constitute ourselves.

I have in making that assumption formulated the attributes which tend to separate, as by a gulf, the phenomena of mind and matter. I have tried to impress once more the monism of that apparent dualism. To emphasize, for it needed emphasis, that mind is matter and matter mind. But for all that, the mystery of both still remains where it was, the inconceivable, impenetrable, source and nucleus of our being, which lies hidden for ever from us. I can find in that remote immutable and distant origin which loses itself in infinity of space as well as of time the only origin not merely of life but of mind. And I therefore ask you to find in it, insoluble though it may be, the key to the only true solution. Let us pause and think awhile of what it all means.

It is the most consistent theory of germ plasm, the substance which contains the elements of consciousness as well as of vitality. It gives to psychology what belonged to physics, and to biology what once belonged to both. It attributes to matter the consciousness which we have always ascribed to mind; and it destroys matter because it shows everything is mind. But it brings biology within the realm of physics, or physics within the realm of biology: and therein, perhaps, does its scientific value mainly rest. It gives to molecular physics a new aspect

for it implies and even demands that atoms and molecules are thinking and alive. It is not so fantastic as to be unfounded, nor so far-fetched as to be without use. In a word, it enables us to see the unity and plurality of nature as one consistent and harmonious whole.

In the doctrine of organic evolution there is much that lies unexplained; partly because biologists have confined themselves to biology, physicists to physics and psychologists to psychology. With us the special ground has been the disputed territory between them. In science and philosophy we need no Venezuelan arbitrators to decide on the dividing lines between these grounds of knowledge. In days I hope now gone by, though even in that case not so very long ago, the narrow provinces of each branch of knowledge have been zealously if not jealously guarded by each of the professors in his own department. These have long been supposed to stand apart like so many separate houses, or if we will, so many water-tight compartments. The less leakage there was, the less communication between the separate compartments; the more they stood apart, the less they saw of each other; the less they knew of each other's work, the better it was held to be, for themselves as well as others. But that remote egotism, that isolation could not last for ever. As work advances the question must arise, whose territory is this and whose is that? That which I am trespassing, is it yours or mine? Though no traveler may have passed through it and left his country's flag, the question must be answered to the satisfaction of one or the other, or of both. If in this adventurous quest, beyond the narrow limits of our own recognized ground, we have found aught that was new or stimulating, we can only say that we hope it will be conceded to be within the scope of more sciences than one. We can only hope that if there is diversity so also let there be unity.

The theory of evolution requires to be viewed from more aspects than one. And in so doing it can be perceived to be the one principle that regulates the development of mind as well as that of matter.

Those difficulties in organic evolution thus seem to imply evolution in inorganic matter, what I might now call mind stuff—and to be surmounted by it. Inert matter has in truth more life than has yet been ascribed to it. It is by a process of sifting out, or in other words by natural selection, that life as we know it and mind as we know it have been evolved. The evolution is in the assortment of monads. The integration and disintegration are from the simple to the many and from the many to the simple. The tendency throughout nature is towards harmony, but there does not appear to have been pre-established harmony as Leibnitz has supposed. Nay, rather everything seems to have been "higgledy-piggledy" and to be gradually settling down. Where there is harmony amongst monads there is good; where there is discord there is evil. The evolution of monads is on the whole towards harmony, and the purpose of the universe towards good; whilst their struggle for supremacy in their ultimate form constitutes the origin not only of life as we know it, but perhaps of evil as we know it too. And with the poet of Buddhism may even the rude believer in materialism exclaim:

> "Behold, I show you Truth! Lower than hell,
> Higher than heaven, outside the utmost stars,
> Further than Brahm doth dwell,
> Before beginning and without end
> As space eternal and as surety sure,
> Is fixed a Power divine which moves to good
> Only its laws endure."

JOHN BUTLER BURKE.

LONDON, England.

LIFE AND THE SOUL.

BIOLOGISTS are agreed that the basic problem of their science is not yet mature for solution. The origin of life is a mystery still shrouded in darkness by a lack of the necessary data which would throw light on the most primitive conditions of life. But while as yet the details of the problem have resisted scientific inquiry, the problem itself, or let me say the philosophical background of the problem, is by no means so hopeless as is commonly assumed. We know enough of life to anticipate the nature of the explanation of its riddles, and there is not the slightest reason to regard the problem as an unfathomable mystery, an enigma that under all circumstances would defy comprehension.

The problem of the origin of life has been classed by Du Bois-Reymond among the seven enigmas of the world[1] and, not without a touch of a love of mysticism, he actually deems the nature of life to be intrinsically unknowable.

In the same way Mr. Spencer and his followers look upon the problem of life as unsolvable, but in both cases we have to deal with a certain philosophical dogmatism which has no foundation. There is a great difference between the unsolvability of a problem on account of subjective and of objective reasons. It is our fault if we do not know enough, and the fault can be remedied. The lacking data can be supplied. But if the obscurity of the

[1] *Die sieben Welträtsel.*

subject were inherent in the facts themselves, no amount of science or inquiry would avail.

We doubt whether we have a right to regard as genuine and legitimate those problems which are *per se* unsolvable, and prefer to characterize them either as illegitimate or futile problems.[2] Illegitimate problems are wrong formulations, and futile problems are those that ought to be formulated as statements of fact.[3] For instance the ontological problem "why is reality real?" or "why does existence exist?" ought to be rendered "what do we understand by reality?" The question of the origin of life is one of the most difficult problems with which science is confronted, and there is little hope of solving it at present on account of its detailed complications. Yet, while we recognize the practical difficulties under present conditions with the means at our command, we deem the problem by no means unsolvable or beyond the grasp of man's reason.

The philosophical problem of the origin of life does not investigate the field of physiological details but limits its inquiry to the main outlines of a solution. It attempts to bring clearness into the chaos of riddles by pointing out the direction in which the answer of the main question must be sought. Above all we must learn to distinguish between two factors, (1) the indispensable elements from which life rises, and (2) the conditions which actually cause it to appear. The former must be assumed to be immanent qualities of existence, the latter come to pass by a favorable combination of circumstances.

THE NEW VITALISM.

It may be considered as an established fact that life is a function, not an entity nor a substance. The idea that

[2] Comp. *Fundamental Problems*, p. 283 ff.

[3] Comp. *Kant and Spencer*, p. 52.

it might be an entity has long been given up, yet the theory that it requires a special life-substance different from other material is still ventilated now and then. This theory is called vitalism and it is too natural an error to be abandoned entirely without at least making the attempt to adapt it to our modern knowledge.

Vitalism in its cruder or primitive form has been surrendered but it is established in a new sense by Bunge, a prominent Swiss biologist. He claims that life is an energy which is as distinct from all other energies as electricity is different from motion or heat, and it seems to us that in this he is right. Sometimes naturalists are carried too far by their enthusiastic zeal to unify all the phenomena of nature and classify them under one head (which in itself is quite legitimate) and insist upon identifying things which are different. The process of life is certainly sufficiently different from other kinds of energy to be regarded as a type of its own. We need not for that reason declare that it is a supernatural phenomenon, or even that it is *per se* mysterious, but we may very well bear in mind that it is a phenomenon *sui generis* which can not be identified either with mechanical motion nor with chemical activity nor electrical phenomena. It is a more complicated process than these three and produces effects which can not be traced in any of the others, and so in my opinion we are perfectly justified in saying that vitality or the function of life is a kind of energy of its own. In this sense we may retain the old idea of vitalism in a modernized form, and classify life by itself.

The conditions of life constitute a department of their own; they are not purely mechanical, nor purely chemical, nor purely electrical. Some processes are mechanical, e. g., the movement of the bones; others are chemical, e. g., the modifications of food stuffs under the influence of saliva; and that electrical phenomena accompany vital

processes has been proved first by Du Bois-Reymond and lately again by Augustus Waller. Yet the properly vital processes are more complicated than any physical phenomena and accomplish things which are impossible by means of organic chemistry. The vitality of living organisms is not a peculiar substance, but a new complication of processes which justifies us in attributing to it a domain of its own which is pretty well marked off from the rest of nature.

The new vitalism, at least as we understand it, must not be interpreted as an attempt at reestablishing dualism, for life remains a natural phenomenon as much as other forms of energy, be it the lightning in the sky, or the falling stone, or the wonderful display of colors in a reflected beam of light. We would say then that the function of life is a manifestation of energy which forms a category of its own. It is as different from physical processes as chemical combinations are different from purely mechanical movements,—or even more so.

METABOLISM.

Living bodies consist of the very same materials of which the rest of the world is composed. Chemistry has resolved matter into some seventy chemical elements, and the elements of organic chemistry are absolutely the same as those of inorganic chemistry. Some of the most unstable and lightest elements play the most important part in the function of life, for we may say that oxygen, hydrogen, nitrogen and carbon are the most essential factors in building up living organisms.

Our own bodies are composed of a certain number of chemical elements, a part of which is being constantly spent, and the sustenance of life depends upon an uninterrupted supply of new material which is furnished partly in the shape of food and partly through breathing.

The constant change of matter that constitutes the vital process is called metabolism, although the German word *Stoffwechsel* is much more expressive than the Greek term. Metabolism exhibits two phases, first the building up of life structures, which is called anabolism, and then their partial break-down, which is called katabolism. Anabolism is accomplished by nutrition which is a transformation and assimilation of food; its result is a storage of energy. Katabolism is produced by spending the energy which is followed by a state of fatigue, i. e., an exhaustion which requires the restoration of the impaired structure.

So far as I know, the best investigations on this subject have been made by Prof. Ewald Hering of Leipsic, who is mainly concerned with the physiology of vision, but his theory has a general application, and our present purpose will be best served by quoting a recapitulation of his work from the *Encyclopaedia Brittanica*, s. v. "Physiology," Vol. XIX, p. 22.

"If the ingenious speculations of Hering, that specific color-sensations are due to the relation of assimilation (anabolism) to dissimilation (katabolism) of protoplasmic visual substances in the retina or in the brain, should finally pass from the condition of speculation to that of demonstrated truth, we should be brought face to face with the fact that the mere act of building up or the mere act of breaking down affects the condition of protoplasm in other ways than the one which we have hitherto considered, viz., that the building up provides energy to be set free and the breaking down lets the energy forth. In Hering's conception the mere condition of the protoplasm, whether it is largely built up or largely broken down, produces effects which result in a particular state of consciousness. Now, whatever views we may take of consciousness, we must suppose that an affection of consciousness is dependent on a change in some material. But in the case of color-sensa-

tions that material cannot be the visual substance itself, but some other substance. That is to say, according to Hering's views, the mere condition of the visual substance as distinct from a change in that condition determines the changes in the other substance which is the basis of consciousness. So that, if Hering's conception be a true one (and the arguments in favor of it, if not wholly conclusive, are at least serious), we are led to entertain the idea that, in addition to the rough propagation of explosive decompositions, there are continually passing from protoplasm to protoplasm delicate touches compared with which the nervous impulses which with such difficulty the galvanometer makes known to us are gross and coarse shocks. And it is at least possible, if not probable (indeed present investigations seem rapidly tending in this direction), that an extension of Hering's view, with such modifications as future inquiry may render necessary, to other processes than visual sensations, more especially to the inner working of the central nervous system, may not only carry us a long way on towards understanding inhibition and spontaneous activity but may lay the foundation of a new molecular physiology. This, however, is speculative and dangerous ground. But it seemed desirable to touch upon it since it illustrates a possible or probable new departure. What we have said of it and of the more manageable molecular problems of physiology will perhaps show that, vast and intricate as is the maze before the physiologist of to-day, he has in his hand a clue which promises, at least, to lead him far on through it."

We do not mean to enter here into the details of the physiological problem. We wish to set forth the philosophical aspect of the question alone, and so we need only the most general data of the physiology of life, and for our purpose it is best to limit our views to the physiology of animal life.

ANIMAL LIFE AND CONSCIOUSNESS.

It is not impossible that animal life is the simpler and more typical, perhaps even the more primitive form of life, and that plant life is of later origin. The differentiation may have occurred when in some cases the katabolic state was abandoned. It is possible that the most primitive organisms are simply metabolic structures, building up and breaking down. The preponderance of either katabolism or anabolism could easily lead to a differentiation. Plants are purely anabolic, while animals are prominently katabolic; and the more they develop their animal nature the more dependent do they become on the anabolism of plants.

Both domains, animals and plants, form a unity. Plant life seems stunted without animal life. It consists in a constant storage of energy waiting for the animal to utilize it, while animal life as we know it can not exist without plant life.

There is another contrast: An animal is, as it were, a plant that has its roots within itself, and a plant is like an animal whose stomach lies outside. This fundamental difference has an important consequence. Plants are stationary, while animals drift about. Plants are limited to the food that is conveyed to them. Animals must seize their nutriment and introduce it into their system, which forces them to go and hunt their food. But this very inconvenience offers them wide possibilities of a further education.

There are some animals which are stationary, such as corals and oysters. They have become fixed in their places by peculiar conditions and their food is carried to them by the surge that is in constant motion. Since we do not mean to enter into the physiological side of the problem, there is no need of discussing this exception which is apparent only and has practically nothing to do with our present problem.

The most important implication in the difference between plants and animals resulting from motility, is the rise of sentiency. In a limited degree plants, too, are sensitive or rather they possess a germ of sensitiveness which is called irritability. Irritability is a feature of all living matter, but in plant life it is limited. On a special irritation, i. e., an impression received from the outside, a certain movement is set free and this process is called reaction. The leaves of the sensitive plant when touched fold upon one another, and the Venus's fly trap will close its lid if a fly enters the calyx. We need not discuss here the finer differences between the irritability in the vegetable world and the sensibility of animal life. Be it sufficient to point out that both animals and plants are possessed of irritability, but that irritability appears in a more highly developed form in animals as sensibility. The main difference is that the irritability of plants remains purely physiological while in animals it develops into psychical states.

Here we touch the most significant feature of existence. In animals sensibility is possessed of an element which in the long course of evolution finally appears in the lower animals as feeling, and in the higher animals, especially in mammals, as consciousness, and in man as self-consciousness.

The appearance of consciousness has been the most puzzling problem of science, and it may be deemed the most difficult complication of the problem of life.

LIFE A PRODUCT OF ORGANIZATION.

The present number of *The Monist* contains two articles on the problem of life, one by Professor Arrhenius, well known for the distinction of having received the Nobel prize, and the other by J. Butler Burke, who has made a specialty of the problem of life. We have our own views on the subject, but are glad to present their solutions in

order to show how men of thought deal with this difficulty, and what propositions they have to make.

It is interesting to learn that so great an authority as Professor Arrhenius deems a transportation of life-germs possible not only from planet to planet, but also from one solar system to another, and so he makes our souls thrill at the idea of a possible kinship of our own life with that of the whole universe. He calls his theory "panspermy," and though it can never be proved, we may grant its possibility. Whether true or not the problem as to the origin of life remains, for if the life of our own planet is due to some germs that have been wafted hither from other worlds the problem remains the same. Those germs must have originated somehow, and if not, shall we consider them as consisting of a substance of their own? Shall we fall back on the old theory of vitalism? This is not Professor Arrhenius's meaning, apparently, for he does not deny that life-germs may also have originated independently on our own planet, and he assumes that the germs of our own planet would be very much like those of extra-terrestrial origin.

Mr. Burke's theory is radically different from that of Professor Arrhenius, and we ought to add, much bolder. He assumes that atoms are not absolutely like one another, an assumption which we may grant as possible, but if there are differences they must be trifling, for scientists are unable to trace them anywhere. We must consider that results produced by actions of masses the constituents of which are counted in numbers in which billions and trillions are negligible quantities, ought either to show irregularities in a marked degree or (if they are rare exceptions) would disappear. Now, so far as our minutest observations have gone, it appears that any molecules of elements can replace any other molecules of the same kind and number, without altering the result; and it would not

be impossible that the ultimate elements of matter of any kind are for all practical purposes absolutely equal. They may be formed with mathematical exactness and may be as true and as perfect in their shape as the light waves of the ether seem to be uniform.

Mr. Burke builds upon his assumption of the irregularity of atoms a new theory of the origin of the variety of different creatures endowed with life.

But the differences in animal organisms, and further in the characters of men, are not founded upon a difference of substance, as Mr. Burke would assume, and can much more easily be explained by a difference in the grouping of the elements of the animated life-cells and by their specialization into different functions. It is not a difference of matter but of form. The villain is made of the same material as the genius. There is no essential difference in their bodily structure, and if we could analyze their brains in an entirely reliable and absolutely perfect chemist's retort, we should not expect to find the slightest difference. Character, as we know, is a matter of form, and the difference implies a difference of activity and also a difference in the direction of activity. No one as yet has tried to discover a material substratum for a difference of direction, for that is due to form and is conditioned by relational circumstances. We might as well try to explain the excellence of Raphael's Sistine Madonna by the peculiarities of the canvas on which it is painted. The same is true in all difference in character, not only between different persons but also between the human and animal organization, and in organized life in general. The animal life-substance which, as chemists teach us, is approximately the same everywhere, will not yield to us the secret of the origin of life, for life is not a matter of substance, nor even of energy, but simply a question of form.

The seat of our intellectual life is generally granted

to be in the brain, and we know that the brain consists of most unstable structures which are subject to a change of material with every act of thinking. How then can we expect that the most essential differences of soul depend upon the peculiarities of some atoms? Suppose, however, this were true, what peculiar complications would arise, what new problems, theoretical as well as practical, and how important it would be to discover the most valuable atoms and to incorporate them into our system! Or shall we assume that there is a central atom somewhere in the brain which is not discarded in the general flux of matter and constitutes our personality?

The difference between living and inert substance, as we learn from its most obvious features, is due to organization. We might as well call living substance organized substance and inert matter that which is not organized. The terms "living" and "organized" are synonyms, and chemistry actually makes this distinction when speaking of inorganic and organic chemistry.

We must, accordingly, next discuss the question "What is organization?"

THE PRESERVATION OF FORM.

The function of organization (as we have stated above) is metabolism, but there is one peculiar feature in metabolism which must not be overlooked, because it is the essential condition of all higher development. This is the preservation of form, and the question now rises, How can the form be preserved of a substance which is confessedly in a constant flux?

The answer is simple enough. Living substance is neither a liquid nor a solid, but a form between the two which is a state of aggregation that is called viscous. Viscosity affords sufficient stability to retain sameness of form in a change of substance, and we must assume that in

the normal metabolism every breakdown or katabolic act is succeeded by an act of anabolism which reconstructs the original form. The breakdown is not entire but only partial. Though all living substance is very unstable, there are portions which are more so than others and to these the breakdown is limited. There the oxygen combines with carbon into carbonic acid, which is discarded as waste. Other elements are more or less implicated. They pass out of the system and in the process of restoration their places are filled up again by elements of the same kind in the very same configuration as their predecessors. We have only to assume that the atoms of organized structures possess a dearth of, or an affinity for, those atoms which break away in the katabolic process. They are thus attracted to their respective places and the result is the renewal of the former configuration.

Biology has investigated the lowest forms of life, such as microbes, fungi, and bacilli, and we see that everywhere life is the product of former life. We have not yet reached the lowest limit of life-forms. The very lowest fungi are already highly complicated, simple though they may appear in comparison to any of the higher animals. They are already the product of a definite heredity, that is to say, of a preservation of definite life-forms. Every kind of bacillus has its own type, and is produced only by spores of its species. We have not yet discovered the simplest forms of life-organisms. In the meantime naturalists have tried by artificial means to produce in the chemist's retort some living substance. They have succeeded in producing organic matter, the first substance thus secured being urea, but they have not succeeded in building up an organism, and there is scarcely any hope for success in producing the smallest living bacterium. This repeated failure has caused mystics to claim emphatically that life is a mystery that can never be solved, but in fact it only

proves that the original life-forms are too small to come as yet under our notice. If we only consider that the smallest fungi are about as complicated in comparison to atoms, as a tree is in comparison to a cell, we will understand that we need better microscopes than are now at our disposal before we can discover the most primitive form of life.

Theoretically considered it should not be impossible to reproduce organized life. The tendency of certain elements to organize into life plasm is in itself no more mysterious than chemical affinities or the formation of crystals.

There is no consistency in the methods of those who see nothing extraordinary in purely physical processes but are overawed when contemplating the basic fact of all biological phenomena, the formation of living structures. There is no less reason why the simplest life-forms under favorable conditions should not organize certain elements into the structure of life-organisms than for vapor to assume the form of snow crystals in the air at a given temperature, and neither process is theoretically incomprehensible. Both are equally mysterious and equally possible.

The difficulty in reproducing the smallest organism at all is due to the fact that all organisms known to us are already the result of a long development. Every one of them possesses a structure of its own which is the product of former impressions, the traces of which have been preserved and constitute its idiosyncracy, i. e., its definite character. In order to produce the simplest fungus we would have to repeat in our laboratory all the processes which this species has passed through, from its origin as a speck of life until it became so specialized as to be a fungus with all its mysterious qualities and endowed with a distinctive character of its own. This may mean a development of millenniums or even more.

Consider then what the formation of a homunculus would imply. It would mean to repeat all the sense impressions that have formed all those numberless structures by artificial means, and the probability is that the natural process would be the quickest way of doing it. We would need for the experiment a planet in its primordial state soon after the formation of its crust, and must then allow a primitive speck of life to pass through the same process as did man from his primeval origin. We grant that the process might be abbreviated, but even then it would take too long to be actually attempted and so nature's way would after all prove the easiest way of producing the homunculus.

Those who are enthusiastic about producing life by artificial means forget the rôle which the preservation of form plays in the development of definite life-structures. So far we have been able to bring under observation only creatures whose character has been sufficiently specialized through a long period of development to make them unquestionably organic in their structure. Our microscopes are not powerful enough by far to show us the interaction even of molecules, much less of atoms. We even do not know whether atoms are discrete bodies of definite outline with a distinct individuality, or whether they are simply a mode of calculating the proportions in which the different elements combine. Until the time of the invention of microscopes that can look into the atomic structure of organisms we are not likely to discover the conditions under which organized life has originated and could be artificially reproduced. But while the origin of life is hidden from our observation there is no reason to assume that it is an unsolvable mystery, for we know positively that the nature of living substance is conditioned by organization, and organization again is a matter of form.

THE SPONTANEITY OF LIVING SUBSTANCE.

The problem has been raised, how can life which is possessed of the faculty of self-motion originate from a world of inert matter? But a closer inspection of the nature of matter will show that even the inorganic elements are not devoid of self-motion. The chemical atoms combine with or separate from other atoms according to definite affinities, and we have no reason to believe that their action is due to push. At any rate the assumption of a *vis a tergo* would be of no help to solve the problem of motion in the world, for it would only place the source of energy further back and would make that substance from which this pressure proceeded the really automatous or self-moving element. There is an activity even in so-called inert matter commonly named gravity, and there is also activity in chemical action. So we might as well consider self-motion an inherent quality of all substance as to credit it to some mysterious medium such as the ether which (for some good reasons) is assumed to surround and permeate the world of gross matter.

With respect to automatous motion organized life is by no means different from inorganic nature. Both move and are moved, there is attraction and repulsion; and if we analyze the nature of attraction and repulsion in the domain of animal life we find that life is possessed of the same kind of energy that is found in the domain of inorganic matter. Energy is simply motion, i. e., change of place; or strain, i. e., the possibility of producing motion. Energy, whether vital or purely physical, is measurable in foot pounds, and considered as energy pure and simple there is not the slightest difference between the two. Accordingly it is not motion nor self-motion which is the typical quality of organized life, but it is that function of the preservation of form which is due to organization, and

which in the animal world becomes the basis of the development of soul.

So far we have come to the conclusion that all existence is possessed of energy, which means it is automatous or bears in itself the power of spontaneous motion. We do not say that this spontaneity is arbitrary or haphazard, but on the contrary we conceive it to respond to stimuli in a definite way according to conditions most rigorously determined by laws of form. This spontaneity common to all existence attains a higher plane of chances with unlimited possibilities through organization. Organization intertwines the action of smaller centers by cooperation into larger and larger groups so as to produce higher and ever higher units of efficiency. There is a certain cooperation also in the physical and chemical world, but the cooperation of organized animal life (as we can infer from its effects) possesses one peculiarity of which inorganic nature seems to be absolutely void. It establishes an interrelation of the inner or subjective aspect of existence and so produces a concentration of its most intimate feature, the in-itself-ness of things.

What this inner aspect of things is can be inferred from its final result in organized animal substances: it is the awareness of their own being, viz., feeling, consciousness, psychic states, implying pain, pleasure and cognition.

THE INNER ASPECT OR SUBJECTIVITY.

The appearance of feeling is sometimes regarded as the greatest riddle of life and so it is. Nevertheless, we claim that whatever may be the practical difficulties of comprehending the several physiological conditions necessary for the rise of sentient organisms, the philosophical problem is not beyond any possibility of solution. We have but to assume that just as energy is a universal prop-

erty of all substances so that quality which is the condition of sentiency must be in existence everywhere.

We conceive of all existence as being like ourselves possessed of two aspects. It manifests itself objectively as action and subjectively as feeling. Within ourselves we are sentient beings, but externally in our relation to other existences we appear as bodies moving about, reacting upon our surroundings.

We call the innerness of existence "subjectivity" and the outerness "objectivity," and we regard both as aspects looked at from two different points of view. Every process in life can be looked at from two sides, either from within or from without. We ourselves call the innerness of our being our soul, and the outerness our body. In ourselves we feel our existence as awareness or consciousness, or in a word, as soul. The word soul most likely means the innerness of things. The German word *Seele* is still used in other applications as the inner portion of things. In the terminology of artillery the hollow inside of the cannon is called *Seele*, and *Federseele* is the pulp that is found inside of a feather.

Now I do not mean to say that atoms or molecules have souls or that they are endowed with intelligence—that theory, which is called panpsychism,[4] is a mistake,—I only claim that every atom (or generally speaking all existence) possesses that subjectivity or innerness, a mere potentiality of feeling, out of which through organization the soul is woven.

Now we note that in the course of evolution which starts with the formation of organized substance, the significance of this innerness or subjectivity grows until it reaches the height of self-consciousness which is a characteristic of the rational soul of man. We must assume, therefore, that the

[4] For a discussion of panpsychism with Mr. Thomas A. Edison and Prof. Ernst Haeckel see *The Monist*, III, 234 ff.

interconnection of atoms and molecules in animal organized substance is such as to favor a cooperation of the subjective elements, while all inorganic combination leaves their inner potentialities still isolated.

The most simple state of consciousness is called a feeling, but we know very well that every feeling is already a highly complicated state of subjective awareness which presupposes a number of minor states of the same kind but more feeble, more insignificant, and less intense. The intensity of a clear and well defined feeling is due to the cooperation of a great number of minor subjective states which are called subliminal feelings because they fall below the threshold of consciousness.

When considering how infinitesimal the sentiency of a fly must be in comparison to the subliminal feelings of a human organism, and again, how much smaller still the sentiency must be of the several tiny cells of which the vital parts of the fly consist, we may approximately realize the absolute dimness of the feeling which stirs the innerness of the most primitive organized substance.

Here, if anywhere, in these minute specks of life-substance, we have a semblance of the mathematical idea of an infinitely small quantity; and yet it is only a semblance of it, for these most primitive structures must be discrete and real bodies which, if they could but become visible in microscopes of enormous power, would reveal a definite shape with a definite interrelation of parts and operating in a definite way. From such a primitive interlinking of subjectivities, the life of the soul has sprung; and we explain the origin of actual feeling out of the potential feeling of subjectivity from the consideration that isolated subjectivities remain blank; they become real feelings only by the cooperation with other potential feelings. Isolated feelings are mere irritability and feelings of any kind, potential as well as subliminal, can become states of aware-

ness only by being felt, and further one feeling can be felt by another only when internally interconnected through organization.

We are inclined to think that the subjective stir which develops into feeling takes place in the process of metabolism. It is a complicated process of oxidation or slow burning and it has been specialized for the function of sentiency in nervous substance, especially the gray matter of the brain.

So far as we can judge, the inner or subjective aspect of existence remains without any significance in the inorganic world, for there the actions or reactions of all things take place according to their external shape only. They have no choice; they act without previous deliberation. Their actions depend solely on their own constitution and the impacts of surrounding conditions. Ideas, thoughts, purposes, are utterly foreign to them. Gravity is determined by mass, chemical affinity must depend upon atomic structure, presumably the axes of rotation, etc. However, in the life of animals the inner aspect is increasingly gaining in significance. While the psychology of atoms (if we may be allowed to use this expression) would possess no significance whatever, the significance of the inner life (of the soul) grows in importance the higher life rises in the onward march of evolution.

MEMORY.

The most significant feature of the function of life (called metabolism) we have recognized to be the preservation of form; the basic condition of all psychical life of animal substance we find to be memory; and these two, the preservation of form and memory are two different aspects of one and the same thing. Memory is the feeling that accompanies the revival of a trace made by a former impression and so we understand that memory (the resus-

citability of feeling) is absolutely dependent upon the preservation of physiological structures.

Organization is a correlation which in animal life renders possible a communion of the subjective innerness of its correlated parts. This means that potential feelings are so interrelated as to produce a common effect; they focus, as it were, several subjectivities into one unified state; they intensify them by concentration, which if strong enough reaches the threshold of actual feeling. But the process can not be one of concentration only. Judging from analogy and trying to explain the lower as yet unknown strata of feeling from the higher ones that lie within the range of consciousness, we assume that contrast and comparison play a most important part in the development of the elementary forms of sentiency also. A feeling or state of awareness is lost unless it be connected with other states of feeling, and especially with memories of the past. In other words feeling in order to be felt must be in communication not only with simultaneous but also with prior feelings. Feeling in order to become a real psychic state can not remain isolated but must be organically interlinked with co-existing as well as pre-existing feeling, and this is possible only through memory.

We know that our feelings are different, and we assume that the difference of feelings is due to a difference of form. The nature of a feeling depends upon the physiological function of which it is the subjective aspect, and the function being a reaction upon an irritation depends upon the structure of the sentient organ and the impression or commotion by which it is caused. The reactions that take place in sentient substance leave traces, and if these traces are somehow stimulated their sentiency is reawakened and thereby a feeling is produced which resembles the former feeling in kind. It reproduces it according to the trace it has left in the living substance, and this reproduction of

former feelings is called reminiscence, and reminiscences are rendered possible through memory, which (we repeat) is the psychical aspect of the preservation of form in living structures. The preservation of form is therefore to be considered as the factor that builds up the soul.

States of feeling, however, are not yet mental phenomena. The most primitive feelings are mere irritations indicating pain or pleasure or indefinite states of various forms. Feelings change into mental states through becoming representative, and this process originates naturally and necessarily in sentient substance under the influence of the surrounding world.

MEANING AND SOUL.

Suppose we have some simple animal structure,—say an ameboid speck of life-substance. It is already highly organized and of a complicated formation in comparison to the most primitive life structures, but it is mere raw material in the eyes of the zoologist. This speck of life is subject to constant impacts of the surrounding world, and we know from the sundry facts which illustrate the doctrine of evolution that certain parts of the organism become specialized for special purposes. Ocelli originate first as spots sensitive to light; the organs of smell and taste originate under chemical influence; the ear, which is first an organ of equilibrium containing the otoliths, responds to sound-waves, etc. Every sensation of the sense organs responds to a definite impression and leaves a trace made on a track of a definite form. When an impression of some kind is made, the irritation travels on the tracks into which it fits to the old traces built up by former impressions and reawakens them. This reawakening is felt as a reminiscence, which by implication means that an impact of the same kind as formerly is being made. In this way sensations acquire meaning, they become rep-

resentative, and external impacts come to signify the presence of external causes.

In the course of evolution the representativeness of sense impressions assumes a clearness which makes possible a conception of the actions that take place in the surrounding world. In other words the things surrounding an organism become more and more represented in analogous forms of feeling. The mind of a creature is nothing but the sum total of and the interaction among all these feelings.

We sum up the case thus: Feelings develop into sentient symbols and the soul is a system of sentient symbols.

This definition of the soul looks very simple but it is of far-reaching consequence. The representativeness of our ideas renders it possible for us to adjust our actions to conditions. It makes possible a conception of the world in which we live. Our soul is comparable to a map of our surroundings in which we know ourselves to be drifting; and since we have definite needs, definite wants, and definite demands, our ideas of things serve us as a guide for our conduct. In place of haphazard reaction, which in chemistry takes place according to the structure of the elements, an animal can adapt its reaction according to circumstances which will serve its own needs, and thus the most important consequence of the nature of the soul as a system of sentient symbols is the possibility of purpose. Man can direct his own course of action according to his foresight and knowledge of the surrounding world and whatever progress has been made and will be made, this will remain true even of the higher man of the future. His dignity and the pride of his superiority will always make it possible for him to pursue a definite purpose. Thereby he can make himself the master of his destiny.

THE RELIGIOUS ASPECT.

We have explained the origin of the soul in its very beginning, but we have not yet touched upon its nature and significance. Nor can we enter upon this subject to any extent because the field is too large and we would need the full space of another article to do it. But we will here in conclusion at least touch upon the problem, lest our explanation of the lowly origin of the soul and the simple mode of its operation be misunderstood.

There are people who have a misgiving as to the doctrine of evolution because it traces the pedigree of man back to the simians, and even further down to protoplasm and to the very mud of material existence; and their objection is in so far well grounded as man in spite of his kinship to all creation and although he consists of dust, is not born of the dust, but is the child of a higher presence. We have learned that the soul originates in sentiency by the meaning which sensations acquire, and soul is the systematized totality of the meanings which reside in the feelings of an organism. Now let us consider how man's mind is built up from small beginnings, and how he attains that marvelous power which makes him master of the earth and gives him the right to claim divine sonship. The growth of soul is a gradual incarnation of truth. The more correctly and adequately the soul reflects the world, the higher it ranges on the ladder of evolution. Truth is the criterion of the worth of the soul. With the light of reason a new vista is opened to the mind's eye, for a rational being catches glimpses of the universal, the eternal, the divine; it recognizes the vestiges of the cosmic order, of the norms of existence, of God. And so the soul of rational beings is an incarnation of those laws that sway the world; it becomes the dwelling place of the Most High, of the power which dominates the world and guides its course

with unfailing consistency—humanly speaking, with an absolute wisdom and perfect justice.

It is true that naturalists and psychologists of the present day are apt to overlook the moral significance of the soul, and a protest, such as that made by Mr. F. H. Gile in the present number, seems justified, but we believe that we can (indeed we shall have to) accept all the well assured consequences of science and the scientific conception of the world, of God, and of the soul, all of which appear so negative to the man who still clings to the old faith, or rather to the letter of its dogmas. We accept the scientific solution without, however, falling a prey to moral indifference, and without losing our ideal aspirations. We recognize that the spirit of the old faith is not wrong and wish to preserve all of it that is true and good. As the unity of a man's soul does not depend upon the presence of a monad in his mind, nor of any concrete unit, (be it an atom or a molecule, or a force center), but upon the systematic unification of reason, so our nobility, our dignity and our moral worth are not dependent upon the belief in the traditional conception of the soul as a mysterious entity. On the other hand, when we surrender the letter of a traditional belief, we need not give up the spirit of it; and so we must still preserve our fidelity to that formative factor that so far has guided our advance. We must preserve our love of truth as a divine authority to be respected in its objective import and to be respected even when it might not suit us, and above all we must practically apply our knowledge; we must not only behold and comprehend, but also actualize in our own being, the interrelation of life with life, of soul with soul, the solidarity of the interests of all, and work out our common aim and our common ideals.

People who know and feel the religious character of our moral aspirations, fear that our ideals may be lost when

the letter of our dogmas passes away, but we have learned that it is not the letter of the old dogmas, it is their spirit which animates all religion and has begotten the dogmas as a transient expression in a bygone period of man's development. For this reason let us listen to the warning of those who find modern psychology, at least as it is commonly taught, sorely wanting in the most essential point—the moral and religious significance of the soul.

EDITOR.

ON SOME POINTS IN THE FOUNDATION OF MATHEMATICAL PHYSICS.

THE need that showed itself, in comparatively modern times, of the greatest attainable logical precision in the concepts and methods of science led, in the field of pure mathematics, to the fundamental work of Weierstrass,[1] Cantor, Dedekind, Frege, Peano, and Russell, and, in the field of physics, to those researches of which the most important are associated with the names of Mach and Stallo.[2] In mathematics, the main result has been the proof that all pure mathematics deals exclusively with concepts definable in terms of the fundamental logical concepts, and that all its propositions are deducible from the fundamental logical principles;[3] and, consequently, Kant's view that mathematical reasoning is not strictly formal, but always uses intuitions, that is to say, the *a priori* knowledge of space and time, can be definitely refuted.[4] But, although

[1] In Weierstrass's case, this need can be seen to be in the highest degree *practical*, since many general theorems in the theory of analytic functions, "proved" by the older analysis, show themselves, on examination, to be unsound or insecure, and point the way to considerations of the very foundations of arithmetic. Such a theorem is that on the existence of a point of condensation in an infinite aggregate of real or complex numbers, of which the importance, in the theory of analytic functions, was seen by Briot and Bouquet, who gave a palpably insufficient proof of the theorem in question.

[2] The tendency towards "physical symbolism" (see a note below) is also marked by some of the works of Maxwell, Kirchhoff, Clifford, Hertz, Karl Pearson, Ostwald, and others. (Cf. H. Kleinpeter, *Die Erkenntnistheorie der Naturforschung der Gegenwart*, Leipsic, 1903; H. Höffding, *Moderne Philosophen*, Leipsic, 1905, pp. 98-117).

[3] Cf. Russell, *The Principles of Mathematics*, vol. i, Cambridge, 1903; especially pp. v, 3-9.

[4] Russell, *op. cit.*, pp. 4, 456-461; cf. Couturat, *Les principes des mathématiques*, Paris, 1905, pp. 235-308.

there is thus no such thing as a philosophy of *mathematics,* as distinct from one of logic, in physics the case is different. The above critical discussions have put in a clear light the fact, which is invariably overlooked by the cruder physicists, that the "world" with which we have to do in theoretical mechanics, for example, is but a mathematical scheme whose function it is to imitate, by logical consequences of the properties assigned to it by definition, certain processes of nature as closely as possible.[5] Thus our "dynamical world" may be called a *symbol* of reality, and must not be confused with the reality itself.[6]

[5] This fact forms the basis of Ward's first argument against naturalism in his *Naturalism and Agnosticism,* 2d ed., London, 1903, vol. i.

[6] Ward (*Philosophical Orientation and Scientific Standpoints* [Annual address before the Philosophical Union of the University of California], Berkeley, 1904, p. 8) called those physicists who realize this gap between the concept and the reality "physical symbolists," as distinguished from the "physical realists," who are metaphysicians in spite of themselves.

When, in this address (p. 2), Ward insists on the implication of some reality behind appearance in the very use of the term "phenomenon," there seems to be a misunderstanding of the scientific position. It has, as is well known, often been urged by philosophers (see, for example, Dr. John Caird's *Introduction to the Philosophy of Religion,* new ed., Glasgow, 1901, pp. 14-15; Ward, *Naturalism and Agnosticism,* 2d ed., vol. i, 1903, p. 24, and vol. ii. pp. 275-276) and others (see, for example, H. Spencer, *First Principles,* 6th ed., 1900, p. 13), that, when we say that a thing is only a phenomenon or appearance, we imply that there is something which is not mere appearance but reality. Now, it is not true that to speak of a thing *a* implies that there is something which is not *a* (for example, to speak of an entity does not imply the self-contradiction that there is a non-entity); so that we must conclude that what the philosophers mean is: The word "appearance" is part of an incompleted phrase "appearance of....," and hence an appearance which is not an appearance *of* anything is a contradiction. But it seems to me that men of science just took the word "appearance" or "phenomenon" as a general term for the facts (of consciousness) which Mach has called by the less metaphysical name of "elements" (*Contributions to the Analysis of the Sensations,* English translation, Chicago, 1897, pp. 5, 11, 18), and philosophers are apparently unable to appreciate the procedure of scientific people of taking a word, which may have had a previous meaning, re-defining it, and thereafter giving it no meaning not provided in the definition. It is true that Mach used the word "Erscheinung" in his *Erhaltung der Arbeit* of 1872 without pointing this out explicitly (he explicitly abandons the use of the word "sensation," because it *seemed* to refer to the (hypothetical) ego, in *op. cit.,* p. 18, but it should at least be remembered that the verbal implication in the word "appearance" is a trace of the philosophical point of view of the naive man (cf. Mach, *op. cit.,* pp. 10, 25-26) who thinks that experience is the knowable result of the interaction between an unknowable thing-in-itself and an unknowable ego. When a man of science talks of "phenomena" he no more implies the existence of another reality than did Mr. Vincent Crummles in *Nicholas Nickleby,* when he spoke of "The Infant Phenomenon."

Again, if we were to use the word "phenomenon" literally, with its reference to a crude philosophy, to talk of "phenomena *per se*" would be to talk

The present paper contains suggestions for the application of the more refined mathematical conceptions—such as those of "continuity" and "motion"—to the mathematical determination of our image of reality. When once we have begun to set up, for what is, at bottom, the *practical* need of completing facts in thought,[7] the mathematical image of the universe, we have left behind all the philosophical problems, and we have only to look to the progress of sciences like those of electricity, chemistry, and psychology for the gradual completion of the image, or model, of the universe, and for the consequent precise answering of epistemological questions.[8] And the mathematician is completely master of his model; he can repeat the occur-

of "those phenomena which are not phenomena, but realities." But, if we use the word in the sense of Mach's "elements of consciousness" and avoid (cf. Mach, *op. cit.*, p. 20) the question: *whose* consciousness?, which arises also from the verbally implied reference to a crude philosophy, I see no reason against calling the phenomena the only reality the "outer" world has for us.

[7] Cf. Mach, *op. cit.* pp,. 151 note, 171-176; *Popular Scientific Lectures*, 3d ed., Chicago, 1898, pp. 236-258, especially p. 253; pp. 186-213; *Die Mechanik in ihrer Entwickelung historisch-kritisch dargestellt*, 4te Aufl., Leipsic, 1901, pp. 510-528 (This work was translated into English by T. J. McCormack under the title *The Science of Mechanics*, Chicago: Open Court Pub. Co., 1893; 2d ed. 1902); *Die Principien der Wärmelehre historisch-kritisch entwickelt*, 2te Aufl., Leipsic, 1900, pp. 365-366, 391-405.

[8] If we neglect the psychological aspect of the answer to Kant's question: How is nature, as a system of laws, possible?, which was sketched in Ward's address, pp. 11 *et seq.*, and *Naturalism and Agnosticism*, vol. ii, and only concern ourselves with what is implied logically by the existence of the science—our above "model" of nature, we arrive at a series of exact answers, expressed, of course, in mathematical language, to epistemological questions, and this series can only be completed when our model is sufficiently complete. As yet, our model may be judged complete in dynamical respects, at least. The postulate (if postulate it can rightly be called) that a model is possible seems to me to be the "postulate of the comprehensibility (or uniformity) of nature."

In this way, it seems to me that the only remaining function for the philosopher, as distinguished from the logician, is to give the mind such acquaintanceship (which Heymans seems to call "absolute knowledge"; *Einführung in die Metaphysik auf Grundlage der Erfahrung*, Leipsic, 1905, pp 1-2) with the conceptions of science (including such subjects as æsthetics and morals, which are as yet hardly more than possible sciences) as it has with redness or the taste of a pineapple (cf. Russell, *op. cit.*, p. v, where also the failure of "the search with a mental telescope" for the notion of *class*, was spoken of).

There are some suggestive remarks on epistemology in Stallo, *op. cit.*, pp. xxxv-xlii, 25-26, 68-69; and Mach, in his *Erhaltung der Arbeit*, of 1872, emphasized the "logical root" in the principle of the conservation of energy. But I will reserve a closer examination of these questions for another opportunity.

rences in his universe as often as he likes, he can make his "sun" stand still, or hasten, in order that he may publish the "Nautical Almanac" several years ahead of time. His position contrasts with that of the mere observer like that of the man who had thirty dollars in his mind with that of the man who had thirty dollars in his purse, in Kant's illustration of the untenability in logic of the ontological proof of the existence of God.[9] The mathematical physicist can, without difficulty, become rich beyond the wildest dreams of avarice,—but by dream-gold.

I.

The first stage in the construction of our image is naturally the formation of a *"dynamical* world." This world closely resembles that of Russell,[10] but it seems to me essential that the "space" should be an aggregate of complex *numbers* (with three unities), and the time should be an aggregate of real *numbers,* for only then can we describe the motions in this world by differential equations.[11] If, on the other hand, the space and time were (as Russell assumed)[12] any continua which are defined *purely ordinally,* we could give a meaning to a certain position being a "function" (even a continuous one)[13] of

[9] Cf. also Russell, *Mind,* 1905, p. 491.
It has been maintained with great ability, that this "proof" is not to be regarded as an attempt at a strictly logical proof, but as meaning that our whole conscious life is based on a universal self-consciousness (Caird, *op. cit.,* pp. 144-150.)

[10] *Op. cit.,* pp. 480-481.

[11] Cf. Russell, *op. cit.,* pp. 326-329. There, even the notion of the *continuity* of a function was defined, after Dini, in a manner which is not purely ordinal, but is applicable, in the first instance, only to series of *numbers.* I have shown (see the next note but one) that the notion of continuity of a function can be given a purely ordinal (not necessarily connected with a series of numbers) definition, but not the notion of a differential quotient.

[12] *Op. cit.,* pp. 288, 437-440, 473.

[13] I have shown (*Journ. für Math.,* Bd. CXXVIII, 1905, pp. 182-199.) that not only *function* (as Russell emphasized, *op. cit.,* pp. 263-267), but also *continuous function,* can be conceived in a purely ordinal manner. That a continuous function could be thus conceived was tacitly assumed by Russell (*op. cit.,* p. 480) in speaking of a continuous function whose argument was a series (not necessarily of numbers).

the time, but we could not to a differential quotient like dx/dt. From this it follows that not only do we have absolute time and position in our dynamical world in contradistinction to our real world, as Ward has already pointed out, but that "measurement" which we apply in actual experiments, has only an analogue in mathematics by a convention.[14] It may be remarked, also, that Russell's[15] statement that the world *may*, in spite of Mach's arguments, quoted by Ward, be twice given, only applies to the "dynamical world" (for there a mathematician is a sort of demiurge), and Mach and Ward were only speaking of our real world.[16]

[14] The "distance" of two "points in an arithmetical space," (x, y) and (x', y'), may be defined, in a way recalling our empirical notion of distance, but which is not purely ordinal, as $+\sqrt{(x-x')^2+(y-y')^2}$, or as Jordan's "écart," $|x-x'|+|y-y'|$. Cf. also Russell, *op. cit.*, pp. 425-428.

[15] *Op. cit.*, pp. 492-493.

[16] The attempt to make certain purely mathematical concepts the foundation of reality may be illustrated by the ludicrous attempts at the substantialization of "ether" and "space" (cf. Stallo, *The Concepts and Theories of Modern Physics*, 4th ed. London, 1900, pp. xxiv-xxvi, 43-44, 227-230, 247; Ward, *op. cit.*, vol. i, pp. 128-138.

Helmholtz investigated mathematically the properties of rotational movement in an absolutely homogeneous, incompressible, perfect fluid, and Lord Kelvin based on these researches his well-known speculations on "vortex-atoms." Now, in order to realize the difference between these two investigations, let us reflect that what a mathematician can only mean by such a "fluid" is a certain aggregate of numbers (the numbers are here complex numbers with three independent unities, so as to mimic the space of experience), while the transformations or "motions" of parts of it underlie certain conditions which are described picturesquely by the words "incompressibility" and "perfection." The whole problem is purely mathematical; but, because, in nature, a process may be more or less exactly described by it when these natural processes are referred to certain determinable axes regarded as "fixed" and the various points of natural space are put in a metrical one-one correspondence with one aggregate of numbers, the names of the natural objects or properties have been transferred, usually in an uncritical manner, to the mathematical *images* of them. This it is that has given rise to the many attempts (of which Lord Kelvin's is an example) to attempt, inversely, to make the mathematical image the essence of the reality. Then we at once get the valid objections that the motion in such a fluid (supposed real) is not sensible, and that the "fluid" itself is, like "atoms" (cf. Stallo, *op. cit.*, p. 156 note), "things-in-themselves" (Stallo, *op. cit.*, p. 159; Mach, *op. cit.*, pp. 6, 23 note), or the result of attempts to reify the mathematical conception of "space" (Stallo, *op. cit.*, pp. 214-215)—in a conception which has arisen psychologically, though not logically, from the "space" of the physicists (cf. Mach, *op. cit.*, p. 55; *Die Principien der Wärmelehre*, 1900, pp. 456-457 and 71-77 [on the physical "continuum"]; *Mechanik*, 1901, pp. 232-253; *Erhaltung der Arbeit*, 1872, pp. 56-57), nothing at all.

The widespread notion that geometry is a science dealing with pure

2.

There comes the question of the meaning of such terms as "causality" in our image. Mach[17] has, now, formulated the law of causality in the form: To every phenomenon α belongs a group which uniquely determines it (of which it is a one-valued function). Even this very general formulation (which includes Petzoldt's[18] "Gesetz der Eindeutigkeit") leads to important consequences: it shows the identity of the two forms in which the principle of the conservation of energy has been expressed, and can itself be transformed mathematically into what is an equivalent of Poincaré's[19] rather vague generalization of the principle of conservation of energy: "Il y a quelque chose qui demeure constant."

From this point, then, there opens a field of *mathematical* research. We have seen that the functions occurring in that aspect of the law of causality with which we have to do in mathematical physics are one-valued functions of many real variables ("phenomena" or "elements," as Mach calls them), which, in the case of dynamics, can

space—a notion not to be confused with the space of the physicists or number-aggregates—leads to many contradictions in geometry and mechanics. There is much that can be done in the investigation of the purely ordinal properties of series, but, in order that arithmetical notions, such as that of a differential quotient, may be used, our "space" and "time" must be numerical aggregates. And when this is the case, the difficulties as to absolute or relative position and motion cease to appear; while position and motion in a "pure" space has the same difficulties as in the "ether" just described. An example of an attempt to retain "the philosophical dictum that all motion is relative," a pure space, and differential equations of motion, in one book on mechanics, is given by A. E. H. Love's *Theoretical Mechanics*, (Cambridge, 1897). A "motion relative to a frame of reference" is only satisfactory if we can, so to speak, ear-mark the frame; and there is no way of doing this in a "pure" space.

[17] Cf. *Die Geschichte und die Wurzel des Satzes von der Erhaltung der Arbeit*, Prag, 1872, pp. 35-37; *Mechanik*, 1901, pp.513-515.

[18] J. Petzoldt, "Maxima, Minima und Oekonomie," *Vierteljahrsschrift für wiss. Philosophie*, Jahrg. XIV, 1890, pp. 206, 354, 417; "Das Gesetz der Eindeutigkeit," *ibid.*, Jahrg. XIX, 1895, pp. 146-203; cf. Mach, *Mechanik*, 1901, p. 409.

[19] *La Science et l'hypothèse*, éd. revue et corrigée, Paris, p. 153.

be replaced by *one* real variable, the time; there arises the question as to what restrictions on these functions (to be continuous, analytic,...) are necessary or convenient in that mathematical image of the real world which we call the "dynamical world."[20] I will illustrate this.

Suppose that x is a co-ordinate in a dynamical problem: in any particular problem our object is to find an expression of x in terms of the time (t), and, in conformity with the law of causality, we assume that x is a (one-valued) function of t:

$$x=f(t).$$

Now, in order that the real number called "the velocity of x at $t=t_0$" ($[dx/dt]t=t_0$) should exist, $f(t)$ must be differentiable at $t=t_0$; and, for this, continuity of $f(t)$ is necessary but not sufficient, while an "analytic" character of $f(t)$ near $t=t_0$ is sufficient but not necessary; and so on. We can, indeed, contemplate the most various dynamical worlds; for example, while the law of causality holds, a moving point may have no velocity at any point of its (continuous) path. For this, we have only to suppose $f(t)$ to be a continuous function without a derivative, as Appell and Jannaud have done.[21]

This thorough investigation of the dynamical world with all the resources of the modern theories of functions and of aggregates, although it seems very far removed from what are commonly supposed to be the objects of mathematical physics, appears to me to be the only way in which we can be sure that the image of reality at which we aim,

[20] For this, cf. A. Voss, "Die Prinzipien der rationellen Mechanik," *Encykl. der math. Wiss.*, iv. I., pp. 20-30.

[21] "Remarques sur l'introduction de functions continues n'ayant pas de dérivée dans les éléments de la dynamique," *Compt. rend.*, T. XCIII, 1881, p. 1005; *Archiv für Math.*, Bd. LXVII, 1882, p. 160.

Similar examples are afforded by the contemplation of one of Peano's "curves" which fill a square, as the path of a moving point (cf. A. Schönflies, *Die Entwickelung der Lehre von den Punktmannigfaltigkeiten*, Leipzig, 1900, pp. 121-125; W. H. Young and [Mrs.] Grace Chisholm Young, *The Theory of Sets of Points*, Cambridge, 1906, pp. 165-170, 219-232, 291-292.)

by successive approximations, is what Hertz[22] called a "logically *permissible* image."

In this way, we shall come across such problems as the following: The law of the conservation of energy is now recognized as a specialized form (the form of which has been discovered by observation) of the law of causality; what limitations on the form of the functions involved in the latter law does this specialization involve?

3

Every theorem in the theory of functions or in that of differential equations brings to light a property of the dynamical world which sometimes appears very surprising. Thus, the (not yet completely solved) problem of finding the necessary and sufficient conditions under which a solution of a system of ordinary (real) differential equations can exist, would give us the necessary and sufficient conditions that a moving body which is somewhere at some time should be somewhere at some other time. But this surprising appearance is only due to our use of phrases we use about real things to describe occurrences in the dynamical world,—a world which has no secrets from us, if our minds are powerful enough, but which is only an image of the real world, although an image which, perhaps, may become indefinitely like the original in certain respects.

[22] Heinrich Hertz, *The Principles of Mechanics Presented in a New Form*, translated from his *Werke*, Bd. iii, by D. E. Jones and J. T. Walley, London, 1899, p. 2.

In this place, it seems proper to refer to Cantor's discovery, at the end of his third paper "Ueber unendliche, lineare Punktmannichfaltigkeiten" (*Math. Annalen.*, Bd., XX, 1882, pp., 113-121), that a continuous motion may be possible in a discontinuous space; and his consequent suggestion that an attempt might be made to form, for purposes of comparison, a "modified mechanics" for spaces of the kind to be described. From a continuous arithmetical space of two or more dimensions, remove an enumerable but everywhere-dense aggregate (such as that of all rational, or of all algebraic numbers). Any two points of the remainder (A) can always be connected by a *continuous* line (formed of a succession of arcs of circles), all the points of which belong to A.

4.

This investigation of the principles of mathematical physics permits us to clear up some difficulties which every mathematician accustomed to exactness feels in current presentations of mathematical physics. For example, in investigating the vibrations of a stretched cord after the method introduced by Lagrange,[23]—in which we contemplate the vibrations of a finite number (n) of masses placed at equal distances along an elastic mass-less "string," and then go to the limit by supposing n to increase *ad infinitum*,—any one who is acquainted with the theory of aggregates makes the following remark. If the cord is a continuum (of type θ); since we cannot say more of the limiting case above than that the mass-points be everywhere dense on the string (a condition which need only make these mass-points of type η) a passage to the limit does *not* give us the cord, since a series of type θ always contains one of type η, but a series of type η never contains one of type θ.

This difficulty, now, vanishes if we assume, as is natural if we wish to make our image conform to nature, that the cord always represents a *continuous* function of its position at rest, a straight line (i. e., "the cord is never to break"). For we know that a continuous function is determined for a continuum (of type θ) when it is given for merely an everywhere-dense aggregate (of type η).

5.

Finally, it may be mentioned that if, and only if, the functions occurring in our formulation of the law of causality, are *rational* functions, a *finite* number of particular

[23] "Recherches sur la nature et sur la propagation du son," *Misc. Taur.*, t. i., 1759, and "Nouvelles recherches," *ibid.*, t. ii., 1760-1761; *Œuvres*, t. i.; cf. Mach, *Wärmelehre*, pp. 110-111; R. Reiff, *Geschichte der unendlichen Reihen*, Tübingen, 1889, pp. 132-134.

determinations of the values of the function suffice to construct the whole function. In other words, the problem of interpolation is here, and here only, determinate. The translation of this into a form suitable for a simple mechanical case is: If the coordinates $q_1, q_2, \ldots, q_\nu$, of a mechanical system are all rational and whole functions of t of degrees which do not exceed n, the finding of the values of the q's for any $n+1$ particular values of t alone suffices for the determination of the complete expression of the q's as functions of t.

The practical importance of this results from the known fact that *any* real, one-valued, continuous function of t can be approximated *quam proxime* by a rational and whole function of t.[24] It is, then, a plausible supposition that the postulate that all the functions occurring in the mathematical formulation of the law of causality are rational and whole functions suffice for the construction of a "dynamical world" which copies, with an approximateness of which any discrepancy is not observable, the scientific aspect of the real world.

PHILIP E. B. JOURDAIN.

BROADWINDSOR, DORSET, England.

[24] This theorem was discovered by Weierstrass ("Ueber die analytische Darstellbarkeit sogenannter willkürlicher Funktionen reeller Argumente," 1885, *Werke*, Bd. iii, pp. 1-37), and other proofs have been given by Picard, Volterra, Runge, Lebesgue, and Mittag-Leffler (cf. Borel, *Leçons sur les fonctions de variables réelles et les développements en séries de polynomes*, Paris, 1905, pp. 50-92).

The extension of the problem of interpolation from *rational* functions to analytic functions in general, and some allied questions was treated in my above-cited paper in the *Journal für Mathematik* for 1905.

SOME AMAZING MAZES.

"Mazes intricate,
Eccentric, interwov'd, yet regular
Then most, when most irregular they seem."
Milton's Description of the Mystical Angelic Dance.

THE FIRST CURIOSITY.

ABOUT 1860 I cooked up a *mélange* of effects of most of the elementary principles of cyclic arithmetic; and ever since, at the end of some evening's card-play, I have occasionally exhibited it in the form of a "trick" (though there is really no trick about the phenomenon,) with the uniform result of interesting and surprising all the company, albeit their mathematical powers have ranged from a bare sufficiency for an altruistic tolerance of cards up to those of some of the mightiest mathematicians of the age, who assuredly with a little reflection could have unraveled the marvel.

The following shall describe what I do; but you, Reader, must do it too, if you are to appreciate the curiosity of the effect. So be good enough as to take two packets of playing-cards, the one consisting of a complete red suit and the other of a black suit without the king, the cards of each being arranged in regular order in the packet, so that the face-value of every card is equal to its ordinal number in the packet.

☞ N. B. *Throughout all my descriptions of manipulations of cards, it is to be understood, once for*

all, that the observance of the following STANDING RULES *is taken for granted in all cases where the contrary is not expressly directed*: Firstly, *that a pack or packet of cards* held in the hand *is, unless otherwise directed, to be held with backs up (though not, of course while they are in process of arrangement or rearrangement,) while a pile of cards* FORMED *on the table (in contra-distinction to a pile placed, ready formed, on the table, as well as to rows of single cards spread upon the table,) is always to be formed with the faces displayed, and left so until they are gathered up.* Secondly, *that, whether a packet in the hand or a pile on the table be referred to, by the "ordinal, or serial, number" of a single card or of a larger division of the whole is meant its number, counting in the order of succession in the packet or pile, from the card or other part at the* BACK *of the packet or at the* BOTTOM *of the pile as* "Number 1," *to the card or other part at the* FACE *of the packet or the* TOP *of the pile; the ordinal or serial number of this last being equal to the cardinal number of cards (or larger divisions* COUNTED,*) in the whole packet or pile; and the few exceptions to this rule will be noted as they occur;* Thirdly,*that by the "face-value" is meant the number of pips on a plain card, the ace counting as one; while, of the picture-cards, the knave, for which* J *will usually be written, will count as eleven, the queen, or* Q, *as twelve, and the king,* K, *either as thirteen or as the zero of the next suit;* and Fourthly, *that when a number of piles that have been formed upon the table by dealing out the cards, are to be gathered up, the uniform manner of doing so is to be as follows: The first pile to be taken (which pile this is to be will appear in due time,) is to be grasped as a whole and placed* (faces up,) *upon the pile that is to be taken next. Then those two piles are to be grasped as a whole, and placed* (faces up,) *upon the pile that is next to be taken; and so on, until all the*

piles have been gathered up; when, in accordance with the first Standing Rule, the whole packet is to be turned back up. And note, by the way, that in consequence of the manner in which the piles are gathered, each, after the first, being placed at the back of those already taken, while in observance of the second Standing Rule, we always count places in a packet from the back of it, it follows that the last pile taken will be the first in the regathered packet, while the first taken will become the last, and all the others in the same complementary way, the ordinal numbers of their gathering and those of their places in the regathered packet adding up to one more than the total number of piles.

Of course, while the red packet and the black packet are getting arranged so that the face-value of each card shall also be its ordinal, or serial, number in the packet, the cards must needs be held faces up. But as soon as they have been arranged, the packet of thirteen cards is to be laid on the table, *back up.* You then deal,—for, let me repeat it, Reader, by the inexorable laws of psychology, if you do not actually take cards, (and the U. S. Playing-Card Company's "Fauntleroy" playing cards are the most suitable, although any that run smoothly will do,) and actually go through the processes, the whole description can mean nothing to you;—*you* deal, then, the twelve black cards, one by one, into two piles, the first card being turned to form the bottom of the first pile, the second that of the second pile (on the right hand of the first pile,) the third card going on the first pile again, the fourth on the second, and every following card being placed immediately upon the card whose ordinal, or serial, number in the packet before the deal was two lower than the former's ordinal, or serial, number then was. *The last card, however, is to be exceptionally treated.* Instead of being placed on the top of the second pile according to the rule just given, it is

to be placed on the table, face up, and apart from the other cards, to make the bottom card of an isolated pile, to be called the *"discard pile"*; while, in place of it, the first card of the pile of cards of the red suit, which card will, of course, be the ace, is to be placed face up on the top of the second of the two piles formed by the dealing, where that discarded card would naturally have gone. Now you gather up these two piles by grasping the first, or left-hand, pile, placing it, face up, upon the second, or right-hand, pile, and taking up the two together; and you then at once turn the packet back up in compliance with the first standing rule. This whole operation of *firstly*, dealing out into two piles the packet that was at first entirely composed of black cards; but *secondly*, placing the last card, face up, on the discard pile, and *thirdly*, substituting for it the card then at the top of the pile of red cards, by placing this latter, face up, upon the top of the second pile of the deal, and then, *fourthly*, putting the left-hand, or first, pile of the deal, face up, upon the second, and having taken up the whole packet, turning it with its back up,—this whole quadripartite operation, I say, is to be performed, in all, twelve times in succession. My statement that in this operation the last card is treated *exceptionally* was quite correct, since its treatment made an exception to the rule of placing each card on the card that before the deal came two places in advance of it in the packet. Had I said it was treated *irregularly*, I should have written very carelessly, since it is just one of those cases in which a violation of a regularity of a low order establishes a regularity of a much higher order, (if John Milton knew the meaning of the word "regular,")—a pronouncement which must be left for the issue of the performance to ratify; and you shall see, Reader, that the event will ratify it with striking emphasis. Already, we begin to see some regularity in the process, since each of

the twelve cards placed on the discard-pile in the twelve performances of the quadripartite operation is seen to belong to the black-suit; so that the packet held in the hand and dealt out, from being originally entirely black, has now become entirely red. Having placed the red king upon the face of this packet, you now lay down the latter in order to have your hands free to manipulate the discard-pile. Holding this discard-pile as the first standing rule directs, you take the cards singly from the top and range them, one by one, from left to right, in a row upon the table, with their backs up. The length of the table from left to right ought to be double that of the row; and this is one of the reasons for preferring cards of a small size. To guard against any mistake, you may take a peek at the seventh card, to make sure that it is the ace, as it should be. The row being formed, I remark to the company, as you should do in substance, that I reserve the right to move as many of these black cards as I please, at any and all times, from one end of the row to the other; but that beyond doing that, I renounce all right to disarrange those cards. Then, taking up the red cards, and holding the packet with its back up, I (and so must you,) request any person to cut it. When he does so, you place the cards he leaves in your hand at the back of the partial packet he removes. This is my proceeding, and must be yours. You then ask some person to say into how many piles (less than thirteen,) the red cards shall be dealt. When he has prescribed the number of piles, you are to hold the packet of red cards back up, and deal cards one by one from the back of it, placing each card on the table face up, and each to the right of the last card dealt. When you have dealt out enough to form the bottom cards of piles to the number commanded, you return to the extreme left-hand pile, *which you are to imagine as lying next to, and to the right of, the extreme right-hand pile*,—as in fact it would come

next in clockwise order, if the row were bent down at the ends in the manner shown in Fig. 1, where the piles (here supposed to be eight in all,) are numbered in the order in which their bottom cards are laid down. Indeed, when more than seven piles are ordered, it is not a bad plan actually to arrange them so. So, counting the piles round and round, whether you place them in a circle or not, you place each card on the pile that comes clockwise next after, or to the right of the pile upon which the card next before it was placed (regulating your imagination as above stated,) and so you continue until you have dealt out the whole packet of thirteen cards. You now proceed to gather up the piles according to the Fourth Standing Rule.

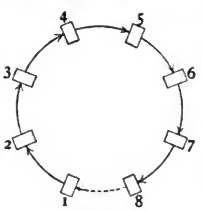


Fig. 1.

That rule, however, does not determine the order of succession in which the piles are to be taken up. I will now give the rule for this. It applies to the dealing of any prime number of cards, or of any number of cards one less than a prime number, into any number of piles less than that prime number. It happens that that form of statement of this rule which is decidedly the most convenient when the number of piles does not exceed seven, as well as when the whole number of cards differs by less than three from some multiple of the number of piles, becomes quite confusing in other cases. A slight modification of it which I will give as a second form of the rule, sometimes greatly mitigates the inconvenience; and it will be well to acquaint yourself with it. But for the most part, when the first form threatens to be confusing, it will be best to resort to that form of the rule which I describe as the third.

For the purpose of this "first curiosity" (indeed, in every case where a prime number of real cards are dealt out,) it

matters not what pile you take up first. But in certain cases we shall have occasion to deal out into piles a number of cards, such as 52, which is one less than a prime number. In such case, it will be necessary to add *an imaginary card* to the pack, since a real card would interfere with certain operations. Now imaginary cards, if allowed to get mixed in with real ones, are liable to get lost. Consequently, in such cases, we have to keep the imaginary card constantly at the face of the pack by taking up first the pile on which it is imagined to fall, that is, the pile next to the right of the one on which the last real card falls. I now proceed to state, in its three forms, the rule for determining what pile is to be taken up next after any given pile that has just been taken. It is assumed that the whole pack of cards dealt consists of a prime number of cards; but, of these cards, the last may be an imaginary one, provided the pile on which it is imagined regularly to fall be taken up first.

First Form of the Rule. Count from the place of the extreme right-hand pile, as zero, either way round, clockwise or counterclockwise,—preferably in the shortest way,—to the place of the pile on which the last card, real or imaginary, fell. Then, counting the original places of piles, whether the piles themselves still remain in those places or have already been picked up, from the place of the pile last taken, in the same direction, up to the same number, you will reach the place of the next pile to be taken.

Fig. 2.

Example. If 13 cards are dealt into five piles, the 13th card will fall on the second pile from the extreme right-hand pile going round counter-clockwise. Supposing, then,

that the first pile taken is the right-handmost but one, they are all to be taken in the order marked in Fig. 2.

Second Form. Proceed as in the first form of the rule until you have repassed the place of the first pile taken. You will then always find that the place of the last pile taken is nearer to that of some pile, P, previously taken, than it is to the place of that taken immediately before it. Then, the next pile to be taken will be in the same relation of places to the pile taken next after the pile P.

Example. Let 13 cards be dealt into 9 piles. Then the last card will fall on the pile removed 4 places clockwise from the extreme right-hand pile. Then, when you have removed four piles according to the first form of the rule, you will at once perceive, as shown in Fig. 3, (where

Fig. 3.

it is assumed that the extreme left-hand pile was the one to be taken up first,) that for the rest of the regathering, you have simply to take the pile that stands immediately to the left of the place of the last previous removal but one.

Third Form. In this form of the rule vacant places are not counted, but only the remaining piles, which is sometimes much less confusing. It is requisite, however, carefully to note the place of the pile first taken. You begin as in the first form of the rule; but every time you pass over the place whence the first pile was removed, you diminish the number of your count by one, beginning with the count then in progress; and you adhere to this number until you pass the same place again, and consequently again diminish the number of your count, which will thus ultimately be reduced to one, when you will take every pile you come to.

Example. Let a pack of 52 cards be dealt into 22 piles. The first pile taken up must be the one upon which the imaginary 53d card falls. It is assumed that, before the deal the cards were arranged in suits in the order ♢ ♠ ♡ ♣ and in each suit in the order of their face-values. Then the different columns of Fig. 4 show the cards at the tops of the different piles while the different horizontal rows

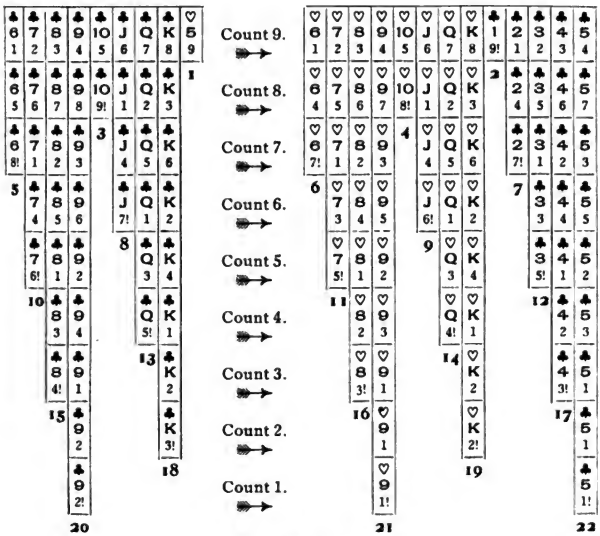


Fig. 4.

show what piles remain, just before you come to count the left-hand-most of the remaining piles, as your countings successively pass through the whole row of piles. The gap between the columns just after the place where the imaginary card is supposed to have fallen, contains the direction thereafter to diminish by one the number of piles you count. Beneath the designations of the top cards are small type

numbers which are the numbers in your different countings through the row of piles; and the last number in each count is followed by a note of admiration that is to be understood as a command to gather up that pile. Beneath it is a heavy faced number, which is the ordinal number of that removal.

I hate to bore readers who are capable of exact thought with redundancies; but others often deploy such brilliant talents in not understanding the plainest statements that have no familiar jingle, that I must beg my more active-

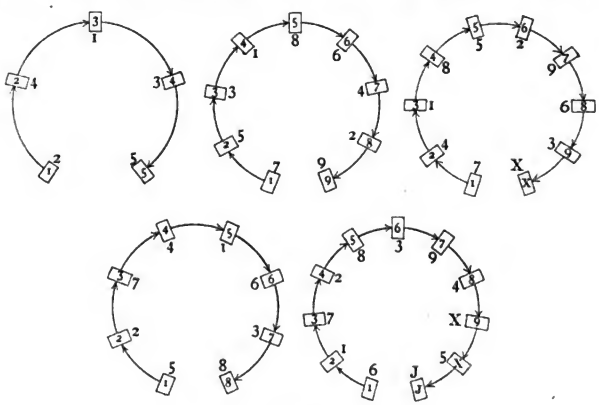


Fig. 5.

minded readers to have patience under the infliction while I exhibit in Fig. 5 the orders in which 5, 8, 9, 10, and 11 piles formed by dealing 13 cards are to be taken up.

When the red cards have thus been regathered, you again hold out the packet to somebody to cut, and again request somebody to say into how many piles they shall be dealt "in order that the mixing may be as thorough as it may." You follow his directions, and regather the piles according to the same rule as before. If your com-

pany is not too intelligent, you might venture to ask somebody, before you regather the piles, to say what pile you shall take up first; but this will be presuming a good deal upon the stupidity of the company; for an inference might be drawn which would go far toward destroying the surprise of the result. Nothing absolutely prevents the cards from being cut and dealt any number of times. When the number of piles for the last dealing has been given out, you will have to ascertain what transposition of the black cards is required. There are three alternative ways of doing this, which I proceed to describe.

The best way is to multiply together the numbers of piles of the different dealings of the red cards, subtracting from each product the highest multiple of 13, if there be any, that is less than that product. The result is the cyclical product. By "the different dealings," you here naturally understand those that have taken place since the last shifting of the black row. If a wrong shift has been made, the simplest way to correct it, after new cuttings and dealings, is to resort to a peep at the black ace, and to determining where it ought to be in the third way explained below.

Thus, if the red cards have been dealt into 5 piles and into 3 piles, since 3 times 5 make 15, and 15—13=2, the cyclical product is 2. You now proceed to ascertain how many times 1 has to be cyclically doubled to make that cyclical product. But if 6 doublings do not give it,—which six doublings will give

1 doubling, twice 1 are 2,
2 doublings, twice 2 are 4,
3 doublings, twice 4 are 8,
4 doublings, twice 8 less 13 make 3,
5 doublings, twice 3 are 6,
6 doublings, twice 6 are Q,—

I say if none of the first six doublings gives the cyclical product of the numbers of piles in the dealings, you resort to successive cyclical halvings of 1. The cyclical half of an even number is the simple half; but to get the cyclical half of an odd number, add 7 to half of one less than that number. Thus,

The cyclical half of 1 is $(0 \div 2) + 7 = 7$;
" " " " 7 is $(6 \div 2) + 7 = X$;
" " " "X is 5;
" " " " 5 is $(4 \div 2) + 7 = 9$;
" " " " 9 is $(8 \div 2) + 7 = J$;
" " " " J is $(X \div 2) + 7 = Q$.

If the cyclical product of the numbers of piles in the dealings is one of the first six results of doubling one, you will have (when the time comes,) to bring one card from the right-hand end of the row of black cards to the left-hand end for each such doubling. Thus, if the red cards have twice been dealt into 4 piles, four cards must be brought from the right end to the left end of the row of black cards. For $4 \times 4 - 13 = 3$ and $1 \times 2^4 - 13 = 3$. But if that cyclical product is one of the first six results of successive cyclical halvinngs of one, one card must be carried from the left to the right end of the row of black cards for every halving. Thus, if the red cards have been dealt into 6 and into 8 piles, 4 black cards must be carried from the left-hand end of the row to the right-hand end of the row. $6 \times 8 - 3 \times 13 = 9$ and it takes 4 cyclical halvings to give 9. If the product of the numbers of piles in the dealings is one more than a multiple of 13, the row of black cards is to remain unshifted.

The second way of determining how the black cards are to be transposed is simply, during the last of the dealings, to note what card is laid upon the king. The face-value of this card is the ordinal, or serial place in the row,

counting from the left-hand extremity of it, which the ace must be brought to occupy. Now if you remember, as you always ought to do, where the ace is in the row, you will know how many cards to carry from one end to the other so as to bring the ace into that place. But if in the last dealing the king happens to fall at the top of one of the piles, two lines of conduct are open to you. One would be, in regathering the piles, by a pretended awkwardness in taking up the pile that is to be taken next before the one that the king heads, at first to leave its bottom card on the table, so as to get a glimpse of it before you take it up, as you would regularly have done at first; and if the king should happen to be the last card dealt, the card at the back of the packet would be the one for you to get sight of, by a similar imitation blunder. In either case, the card you so aim to get sight of would show the right place for the ace in the row. But if you doubt your ability to be gracefully awkward, it always remains open to you to ask to have the red packet cut again and a number of piles for a new deal to be ordered.

The third way of determining the proper transposition of the black cards is a slight modification of the second. It consists in looking at the card whose back is against the face of the king, when you come to cut the red packet so as to bring the king to the face. [Any practical psychologist, such as a prestigiator must be, can, with the utmost ease look for the card he wants to see, and can inspect it without detection.]

But whichever of these methods you employ, you should not touch the row of black cards until the red cards, having been regathered after the last dealing, you have said something like this: "Now I think that all these dealings and cuttings and exchanges of the last cards have sufficiently mixed up the red cards to give a certain interest to the fact that I am going to show you; namely, that

this row of black cards form an index showing where any red card you would like to see is to be found in the red pack. But since there is no black king in the row, of course the place of the red king cannot be indicated; and for that reason, I shall just cut the pack of red cards so as to bring the king to the face of it, and so render any searching for that card needless." You then cut the red cards. That speech is quite important as restraining the minds of the company from reflecting upon the relation between the effect of your cutting and that of theirs. Without much pause you go on to say that you shall leave the row of black cards just as they are, simply putting so many of them from one end of the row to the other. You now ask some one, "Now, what red card would you like to find?" On his naming the face-value of a card, you begin at the left-hand end of the row of black cards and count them aloud and deliberately, pointing to each one as you count it, until you come to the ordinal number which equals the face value of the red card called for; and in case that card is the knave or queen, you call "knave" instead of "eleven" on pointing at the eleventh card, and "queen" on pointing at the last card. When you come to call the number that equals that of the red card called for, you turn the card you are pointing at face up. Suppose it is the six, for example. Then you say, naming the card called for, that that card will be the sixth; or if the card turned up was the knave, you say that the card called for will be "in the knave-place," and so in other cases. You then take up the red packet, and counting them out, aloud and deliberately, from one hand to the other, and from the back toward the face of the packet, when you come to the number that equals the face-value of the black card turned, you turn over this card as soon as you have counted it, and lo! it will be the card called for.

The company never fail to desire to see the thing done

again; and on their expressing this wish, after impressing on your memory the present place of the black ace, you have only to hold out the red cards to be cut again, and you again go through the rest of the performance, now abbreviating it by having the cards dealt only once. The third time you do it, since you will now have given them the enjoyment of their little astonishment, there will no longer be any reason for not asking somebody to say what pile you shall take up first, although that will soon lead to their seeing that all the cuttings are entirely nugatory. Still they will not thoroughly understand the phenomenon.

If you wish for an explanation of it, the wish shows that you are not thoroughly grounded in cyclic arithmetic, and that you consequently still have before you the delight of assimilating the first three *Abschnitte* (for that matter the first hundred pages would suffice to reveal the foundations of the present mystery; but I confess I do not particularly admire the first Abschnitt) of Dedekind's lucid and elegant redaction of the unerring Lejeune-Dirichlet's "*Vorlesungen über Zahlentheorie.*" But, perhaps, on another occasion I will myself give a little essay on the subject, "adapted to the meanest capacity," as some of the books of my boyhood used, not too respectfully, to express it.

CHARLES S. S. PEIRCE.

MILFORD, PA.

A BRIEF HISTORY OF EARLY CHINESE PHILOSOPHY.

ETHICS.

CONFUCIANISM.

THE moral life can be said to have been the only philosophical subject which has seriously interested the Chinese and has been considered worthy of their earnest speculation, from their earliest stage of culture down to the present day. It has been their inmost conviction that the universe is the manifestation of a moral principle, and that every existence has some mission in its way to teach humanity a moral lesson. They did not, however, conceive the world to be the creation of a personal god who superintends and directs its course. Their Heaven (*t'ien*),[1] or Heavenly way (*t'ien tao*),[2] or Heavenly Ordeal (*t'ien ming*)[3], is a sort of natural law, that is not personal but somewhat deterministic. When we do not follow its regulations, we suffer the consequence merely because we violated it, and not because we incurred the displeasure of some august being. The Heavenly Way is thoroughly moral and would not tolerate anything that contradicts it, but no religious significance seems to have been attached to their conception. Man is a moral being pure and simple, there is no intimate relation between morality and religion, as the

[1] 天 [2] 天道 [3] 天命

latter is generally understood by Christians. Throughout the writings of Confucius we are unable to find any religious appeal made either by him or by his followers to a power supernatural or transcendental. If they had a clear conscience they had everything that they desired, and there was nothing outside that would disturb their peace of mind. They were thoroughly moral, they were thoroughly human. Therefore, Confucius made humanism the first principle of his ethics, and that is the very reason why the Chinese honor Confucianism in preference to all other doctrines as their national teaching. Therefore, it is necessary first of all to understand what makes up the principle of humanism in order to arrive at the central and vital point of Confucianism.

Jên,[4] the Fundamental Virtue.

Every Chinese thinker agrees that man and nature are not mere accidents, that their existence can not be a haphazard affair, but that there is a Tao, that is, a way or norm, which is the regulator of human conduct and the guide of natural events. There was no dissenting voice among the thinkers so far as the existence of a Tao was concerned. What vehemently engaged them in discussion and controversy was the being or nature of the Tao. The issue was whether it was metaphysical or simply moral, whether it was transcendental or positivistic. The Taoists thought it was the former, while the Confucians adhered to the latter conception. The Tao, says Confucius, is no more than *jên*.

Now, it is very difficult to find a proper English equivalent for the Chinese *jên*. Broadly speaking, it is sympathy, or lovingkindness, or friendly feeling, or feeling of fellowship.

The Chinese character (仁 *jên*) is made out of the two

[4] 仁

component ideograms 人, man, and 二, two, and its signification is that there is an inborn feeling in every man's heart, which is awakened when he comes in contact with another fellow-being, forming the permanent band of association between them. This feeling, Confucius declares, is the foundation of society and the road to all human virtues. It is the Tao; it is the road which must be traveled by every social being; it is the door that must be passed through when going out (Analects, B. VI, 15) of the house. No moral being can live without this Tao, this road, for that which can be dispensed with even for a moment is no more the Tao. (Chung Yung, I.) Therefore, the Tao is the feeling of fellowship, and the feeling of fellowship is the Tao.

This fellow-feeling is the reason of the Golden Rule. Without it, one will not be kept from doing to others what one would not have done by others. (Analects, XII, 2; XV, 23.) For indeed the feeling is humanity itself. Says Confucius: "A man who has *jên*, wishing to establish himself, will have others established; wishing himself to succeed, will have others succeed." (Book VI.) The feeling of fellowship is the primary altruistic instinct of man, which in spite of his innate egoism drives him out of his narrow selfish limitations, and which seeks its own satisfaction through a negation, as it were, of himself. Confucianism does not believe in the innate baseness of human nature, that is, in its absolute egoism; but it asserts the existence in every human heart of an altruistic impulse. The latter is not a modified development of egoism, but inherent in humanity.

It is in this spirit that Mencius says, "Everybody has a feeling for others which he is unable to control. Suppose a child is at the point of slipping down into a pit. It awakens in the spectator a mingled feeling of apprehension and compassion, which urges him to an immediate rescue

of the child. This is not because he wants to incur a favor upon its parents. This is not because he wants to be honored by his friends or fellow-villagers. This is simply because he can not bear its pitiful scream. Men who have no feeling of pity, therefore, are no human beings." (Book III.) As Schopenhauer made sympathy (*Mitleid*) the foundation of his ethics, so the Confucians consider feeling of fellowship as the prime principle on which the grand edifice of human society is built.

All virtues spring from *Jên*. They are no more than the modifications of this fundamental feeling, as it comes in various ways or relations with the will, intelligence, desires, and impulses. The circumstances under which we move are ever changing, and our feelings respond to them accordingly, assuming thereby different names, such as loyalty, filial piety, courage, propriety, faithfulness, righteousness, longsuffering, and benevolence. Therefore, Confucius affirms that in his dealings with men and things he had only one principle (*tao*) to guide him (Analects, B. IV, 15); and that by this he meant no more than the feeling of fellowship, is confirmed by most Confucians.

Judging from the general trend of Confucianism, only two moral principles are possible: one is fellow-feeling or altruism and the other is egoism (cf. Mencius, Book VII). When our feelings do not go out to our fellow-beings, they are concentrated on our own selfish motives. When the latter sense is cultivated at the expense of the former, society falls into pieces and humanity is ruined, and the *raison d'être* of a moral being is lost. Mencius, therefore, says: "*Jên* (fellow-feeling) is man himself"[5] (which is also pronounced *jên* in Chinese).

To quote Mencius again, "Fellow-feeling is the highest heavenly honor ever given to men. It is the safest abode ever secured for men. There is nothing that could check its

[5] 仁者人也

course." (Mencius, B. VII.) Ch'êng-tze, a great philosopher of the Sung dynasty, says, "Fellow-feeling is the norm of the universe. When the norm is lost there ensues lawlessness and discord."[6] Chou-Tze, another and later great Confucian, comments on *Jên*, saying, *"Jên* is the virtue of the soul and the reason of love."[7] From these quotations, we shall be able to understand what an important position the theory of fellow-feeling occupies in the ethical system of Confucianism.

But it must be noticed that *Jên* was used by Confucius as well as by his disciples not only in its general and ultimate significance, but in its specific applications. To them, *Jên* meant not only the most fundamental ethical feeling innate in man, but its particular modification as it is practised in our daily life. Every reader of the Confucian Analects is well aware of the various senses in which the term *Jên* is used by the Master, and we may sometimes be at a loss how to arrive at a definite conception of it. But the fact seems to be that Confucius himself did not have a very clear analytical comprehension of his central idea. He was indeed conscious of one ultimate principle underlying all virtues generically known as *Jên*, as he declared that he was guided by only one principle in his daily conduct. But he applied the term *Jên* rather indiscriminately to this principle as well as to its practical specifications. Hence the apparent confusion in which *Jên* is used in the Analects.

Dr. Y. Kaniye enumerates in his contributions to the study of Confucius (p. 297) the five different shades of meaning given to *Jên* by the Master, which are (1) prosperity,[8] (2) kindheartedness,[9] (3) charity,[10] (4) sincerity and sympathy,[11] (5) unselfishness[12] (or self-control). When

[6] 仁者天下之正理 失正理則無序而不和
[7] 仁者心之德愛之理 [8] 利澤 [9] 重厚 [10] 慈愛
[11] 忠恕 [12] 克己

the Chinese speak of three or five cardinal virtues, *Jên* must be understood in its specific sense.[13]

Now, the question is, "How are we to cultivate fellow-feeling and put it in actual operation in our every-day life?" This is the gist of practical Confucianism, and the moral efforts of its followers are concentrated on it. Even the Master himself did not claim to have brought his fellow-feeling into perfect development, and naturally none of his three thousand disciples were said to have attained to it. But Confucius declared toward the end of his life: "I behave myself as my heart desires, yet it never transgresses the mean." (Analects, B. II, 4.) Here he may be said to have reached the state of perfect adjustment between natural impulses and moral discipline. He is now *Jên* itself. He has no scruples, no hesitancy, no deliberation as to what would be his proper conduct under certain conditions. He is no longer hampered by any improper thoughts and impulses. When a person reaches this stage, he is said to be a sage, or holy man (*sêng jên*),[14] and Confucius, according to the Chinese, fully deserves this title. He behaves as freely and innocently as a child fresh from the bosom of nature, and all that he does never deviates from the Middle Way (*Chung tao*).[15]

Reverence and Self-Inspection.

Let us now approach the question: "By what means could one reach this pinnacle of moral perfection?"

According to Confucius, *Ching*[16] or *Kung*[17] is the road that finally leads to the perfection of humanism and to the full development of fellow-feeling. It is a reverential attitude of a moral person toward his own being. Etymolog-

[13] The three cardinal virtues are: wisdom (*chi*) 智, *humaneness* (*jên*) 仁 and courage (*yu*) 勇. The five virtues are: humaneness (*jên*) 仁, righteousness (*i*) 義, propriety (*li*) 禮, wisdom (*chi*) 智, and faithfulness (*shên*) 信.

[14] 聖人 [15] 中道 [16] 敬 [17] 恭

ically, *Kung* is made up of "heart" and "many hands," which latter means "together" or "conjoined." It is a state of mind prompting reverential deportment. *Ching* which is made up of "carelessness" and "tapping," means self-restraint, self-respect, deliberation, gravity, and dignity. *Ching* and *Kung* are generally used together to make the one clearer and more definite by the other. But, separately, *Kung* is more of the outward deportment and *Ching* of the inner feeling. When the feeling is carefully nourished and purified within, and the outward manners are deliberately trained, the egoistic impulses are gradually subdued and the altruistic sentiment proportionately grows until the time comes when the sentiment and the impulses are thoroughly harmonized.

The Confucians have no personal God that directly takes charge of the human soul. They do not appeal to any outward object to be elevated in their moral life. They concentrate all their spiritual efforts on themselves to develop from within what they possess by their very nature. They endeavor to be modest in their self-asserting claims. They keep themselves well guarded against any possible intrusion of evil, inhuman thoughts and impulses. They inspect themselves closely to see whether anything that is not of fellow-feeling is being stirred in them. They move about very deliberately and reverently not to let loose any evil, selfish impulses, which they might innocently awaken in themselves. Therefore, Confucius says, when asked how *Jên* should be practised: "When you are away from home, behave yourself as if receiving a great personage. When employing people, behave yourself as if assisting at a great sacrifice. Do not do to others what you would not have others do to yourself." (Book XII.) This is tantamount to saying, "Keep yourself always in a reverential mood, and let not your hasty and improper passions take hold of you." In reply to his favorite disciple, Yen

Hui, Confucius says: "Overcome your egotism and return to propriety (*li*)." When asked for further details, he added, "Do not see anything that is improper. Do not listen to anything that is improper. Do not speak anything that is improper. Do not move towards anything that is improper." (Book XII.) According to these injunctions, the Confucian method of maturing a feeling of fellowship is to give the necessary psychological time to all the impulses, so that when the first storm of emotional agitation is over, the mind will be in readiness for proper adjustment and action. When this practice is repeated with the whole heart and with sufficient frequency, one's deliberate moral judgments and headstrong natural impulses will finally be adjusted, any feeling or thought that is improper and inhuman being perfectly subdued and all that is of fellow-feeling being matured to its full strength.

Sincerity (chêng).[18]

Thus it will be evident that the first step which a man must take to realize and perfect a feeling of fellowship, is to guard himself in his solitary moments, that is, to be sincere with himself, not to play the hypocrite, and to freely manifest the feeling as it moves within.

So we read in The Great Learning[19] (Chap. VI): "By being sincere in all one's soul-activities (*i*)[20] is meant that one should not deceive oneself as in disliking an offensive odor or in being attracted by a beautiful color. This is called being sufficient unto oneself. Therefore, the superior man must ever be watchful over the self in his solitary moments.

"There are no evil things which the mean man in his retired moments would shrink from doing. But when he sees a superior man he becomes deceitful, trying to cover his evils and to manifest his goodness, although others can

[18] 誠 [19] 大學 *Tai Hsiao*, one of the four books of Confucianism. [20] 意

recognize him as if looking into their own lungs and livers. What then is the use [of trying to hide evil thoughts]? This is to say that whatever is really within yourself will be manifest without. Therefore, the superior man must ever be watchful over the self in his solitary moments."

And again in the *Doctrine of the Mean*:[21]

"The Tao is not a thing that could be done without even for a moment. What is done without is not the Tao. Therefore, the superior man is ever watchful over himself even when he is not heard. Nothing is so manifest as that which is hidden; nothing is so conspicuous as that which is invisible. Therefore, the superior man is ever watchful over the self in his solitary moments."

Evil thoughts are more ready to creep into one's heart in his solitary moments than at any other time; improper impulses find his ear more prepared then than at any other time for their whisperings. Be deliberate and scrupulous, watch over yourself religiously, when you are alone. This is the way to be sincere to yourself and to avoid all improper thoughts that are not in accord with the tender, loving, self-sacrificing fellow-feeling. "Sincerity (*chêng*)[22] is the heavenly way, and to be sincere (*chêng chih*)[23] is the human way,"—so runs the declaration of Confucius. *Jên* then naturally came to be identified with sincerity of heart, and how to be sincere with oneself became a paramount issue with later Confucians.

That the doctrine of sincerity is to be developed from the Confucian conception of fellow-feeling is quite natural. Admit the existence of an altruistic impulse in man, and also admit that this impulse could be matured into a constant, ruling, central and animating moral emotion through a systematic training, and that the discipline consists in maintaining a habitual reverential attitude toward one's own moral personality; and the natural course of develop-

[21] *Chung yung*, 中庸, another of the Four Books. [22] 誠 [23] 誠之

ment in practical Confucianism will be the doctrine that one should guard oneself against the arrogance of self-assertion in solitary moments, when all external inhibitory forces are absent. This self-examination or self-introspection will gradually unfold the sense of moral dignity, naturally associated with which is the desire to be sincere to oneself as an ethical personality. Through sincerity now one's moral value will be positively appreciated, the altruistic feeling will be developed so as to regulate the egoistic within its reasonable limits.

Thus, the *Chung Yung* (Doctrine of the Mean), generally considered to have been written by the Master's grandson and the teacher of Mencius, rather systematically advances the doctrine of sincerity which is the doctrine of the mean. The author Tze Sen seems to have been a more synthetic intellect than his Master, and his doctrine of sincerity is comprehensive. We read in the Chung Yung:

"Intelligence unfolding through sincerity is Essence (*hsing*).[24] Sincerity reached through intelligence is Religion (*chiao*).[25] When sincerity is attained intelligence is attained; when intelligence is attained, sincerity is attained." (Chapter XXI.)

"It is only through the perfect sincerity of the universe that Essence is thoroughly comprehended. When Essence is thoroughly comprehended, the essence of humanity is thoroughly comprehended. When the essence of humanity is thoroughly comprehended, the essence of things is thoroughly comprehended. When the essence of things is thoroughly comprehended, one can assist heaven and earth in its evolutionary work. When one can assist heaven and earth in its evolutionary work, one can be said to be occupying the same rank as heaven and earth. (Chapter XXII.)

[24] 性 [25] 教

"Sincerity works by and through itself; the Path leads by and through itself. Sincerity is the end and the beginning of things. Without sincerity no existence is possible. Therefore, sincerity is most honored by the superior man.

One who possesses sincerity makes perfect not only himself, but others. That which makes the self perfect is humanity (*jên*), that which makes others perfect is intelligence. These are the virtues of the Essence, and the way leading to the unity of the internal and external. Therefore, there is not a moment when they are not exercised in the fitness of things. (XXV.)

"Perfect sincerity never ceases working. The reason of heaven and earth can be comprehended in one word. What makes the reason is not dualistic, and therefore it knows no limits in the creation of things; the reason of heaven and earth is wide, solid, high, bright, far-reaching, and everlasting." (XXVI.)

According to this, the Tao is identified with sincerity (*ch'êng*), for it is sincerity that works out the transformation and constant growth of the ten thousand things, and that completes and guides the course of the universe. Without sincerity no being could come to existence, no change or transformation could take place. Sincerity is law, constant in its work. It composes the essence of human being. All moral qualities grow naturally from the cultivation of this fundamental virtue. Be sincere to yourself, be sincere to your own true nature, and above all be sincere to the laws of the universe that make the ten thousand things grow and regulate the concatenation of the four seasons.[26] For sincerity is the essence of human being. For it is humanity itself.

[26] Confucius once said (Analects, Book XVII): "I wish to keep silence." Tze-kung, one of his eminent disciples, who was surprised at the Master's remark, said: "If the Master keeps silence, what shall we, humble disciples, have to record?" Confucius said: "What does Heaven ever speak? The four seasons come in turn, and all things grow. Does Heaven ever speak?" There are certain well-regulated laws in the universe which pursue their course

In concluding this paragraph on sincerity, it may be remarked that the Kantian precept of morality, "so to will that the maxim of thy conduct can become a universal law," had been most explicitly foreshadowed long before his time by one of the most representative Confucians, the author of the *Chung Yung*. There are some cosmic laws pervading and regulating all things, which, when subjectively interpreted, are no more than sincerity. Man as a moral and rational being must conform himself to these laws, must be sincere to himself, must work out what his inner reason or altruistic feeling of fellowship dictate, for these dictates are no more than cosmic laws themselves issuing from the sincerity of heaven and earth. Therefore, "the superior man moves so as to make his movements in all generations a universal path; he behaves so as to make his conduct in all generations a universal law, he speaks so as to make his words in all generations a universal norm." (XXIX.) Why? Because "the way of the superior man never errs: have it applied to himself, or have it bestowed upon the masses of people, or have it judged by the [ancient] three sage-kings, and it never errs. Have it established in heaven and earth, and it never violates; have it examined by all spiritual beings, and its truth is never doubted; leave it to be sanctioned by holy men after a lapse of one hundred generations, and yet no uncertainty remains [as to its verity]."

Mencius.

The development of the Ante-Ch'in Confucianism must be said to have attained its consummation in Mencius, who was the best representative interpreter of his master. Indeed, were it not for his most brilliant defense and upholding of the system, it would perhaps never have enjoyed

without demonstration. Find them in our own hearts, and sincerely follow them as they dictate. This is the Confucian common-sense intuitionalism.

its triumphal progress throughout the long subsequent history of Chinese thought.

In his days there were many different doctrines propounded by able original thinkers, each of which struggled to gain the upper hand over the others. Confucianism did not thrive any better than other systems, and if it failed to have such a brilliant and masterly personage as Mencius among its followers, it would have fared quite differently. Mencius did to Confucianism what Chwang-tze did to the philosophy of Lao-tze, and in many respects each disciple typically represents the doctrine that his master had so eloquently expounded.[27]

What Mencius contributed to Confucianism is his doctrine of the essential goodness of human nature. This was a natural sequence from the conception of fellow-feeling and that of sincerity. Grant that every man is endowed with an altruistic impulse called by Confucius "feeling of fellowship" (*jên*), that this could be developed and matured by reverence and sincerity which finally keep under restraint all impetuous, self-disgracing, egotistic impulses and desires, and that it is by and through sincerity, as is most explicitly stated in the Doctrine of the Mean, that the movement of the heavenly bodies is made possible, the cycle of the four seasons, the growth and transformation of all living things on earth, the existence of natural and moral laws which bind together all beings animate and inanimate

[27] When we scan their works, the character of each looms up with great clearness and definiteness. One is dignified in mien, deliberate in speech, and stately in movement; the other, quite opposite to this, is free and unrestrained in every way. We can mentally picture one donning a golden robe with the embroidered figures of dragon and phœnix, and sitting on a throne bedecked with all kinds of brilliant gems, and presiding over an assembly of noblemen, who reverently bow before his august personality which is singularly tempered with humane expression. The other, however, might be imagined as swinging himself in a rustic hammock among luxuriant summer greens, his old, almost thread-bare dress loosely hanging about him, and with an expression which hardly betrays a trace of earthly concern, when his eyes are rapturously raised toward a drifting cloud in the distant sky. What a pitiful fate it was that these two geniuses possessing peculiarly contrasted characters, but both endowed with unusual dianoetic power and living contemporaneously in the same land, never chanced to see each other!

in a harmonious whole. "What then is this sincerity?" may naturally be asked. Being a practical moralist, Mencius did not speculate on the problem from the standpoint of a metaphysician. He did not think of a sort of cosmic mind that might be existing in heaven and earth and regulating things in sincere conformity with its essential goodness. But he reflected within himself: As long as it is sincerity that keeps order in nature and society, sincerity must be said to be synonymous with harmony and goodness. Man as essentially a manifestation of sincerity must be good in his nature. If otherwise, how could he develop any virtue at all within himself? How could being sincere to his nature be considered the height of morality? Man must be essentially good in his nature, as he cannot develop from within what he is not naturally endowed with.

Mencius thinks that it is human nature to be good, just as it is the nature of water to seek its level, or as it is the nature of the willow tree to be pliable and elastic.

Kao-Tze[28] said, "Nature is like a running water: when it is turned eastward, it flows eastward; when it is turned westward it flows westward. Human nature has no choice between good and not-good as water has no choice between east and west." To this, Mencius replies, "Truly, water has no choice between east and west, but has it no choice between up and down? The goodness of human nature is like water seeking the lowest level. There is no man who is not good, there is no water that does not seek its lowest level. Now, that water when whipped and tossed could be passed over one's forehead, or that when arrested and driven in another direction, it could be made to go over a hill, is not in the nature of water. It is due to the force of circumstances. Man could be made to do not-goodness, for his nature is as susceptible as water." (Book XI.)

[28] Kao-Tze seems to have been a philosopher contemporary with Mencius. He did not leave any work of his own, but in many ways he seems to have taken issue with Mencius on the subject of human nature.

Further below in the same book Mencius gives the content of goodness when he says: "Man's impulse is to do good, for his nature is good. That he does not do good is not the fault of his natural faculty. A feeling of sympathy, everybody has it; a feeling of shame, everybody has it; a feeling of reverence, everybody has it; a sense of discrimination, everybody has it. The feeling of sympathy[29] is humaneness (*jên*); the feeling of shame[30] is justice (*i*); the feeling of reverence[31] is propriety (*li*); and the sense of discrimination[32] is intelligence (*chi*). Humaneness, sense of justice, propriety, and intelligence are not what is molded into us from without. They are inherent in us, only that people are not conscious of them.

"Therefore, a man without a feeling of sympathy is not human; a man without a feeling of shame is not human; a man without a feeling of deference is not human; a man without a sense of discrimination is not human. The feeling of sympathy is the starting-point of humaneness; the feeling of shame is the starting-point of justice; the feeling of deference is the starting-point of propriety; and the sense of discrimination is the starting-point of intelligence. A man has these four starting-points as he has four limbs; and those who, having these four starting-points, plead incapability are mutilating themselves." (Book III.)

Of these elementary moral sentiments making up the content of goodness, Mencius seems to have thought the first two, humaneness and righteousness (or justice), to be more fundamental than the other two; for he says (Book XI): "Humaneness is the human heart, and righteousness (or justice) is the human way. I pity those who digressing from the way do not walk in it, and those who abandoning the heart do not know how to regain it." Again (Book XIII), when he was asked what was the work of a scholar, he replied that it consists in the ennoblement of

[29] 惻隱 [30] 羞惡 [31] 辭讓 [32] 是非

his mind. When further asked, he said: "It is no more than [the cultivation of] humanheartedness (*jên*) and righteousness (*i*). It is not humanhearted to kill even a single innocent being; it is not righteous to take what is not one's own. Where is our abode? Nowhere but in humanheartedness. What is our way? Nowhere but in righteousness. To abide in humanheartedness and to walk in righteousness, here lies the consummation of a great man's work."

Lastly, in Book XIV, Mencius repeats that "Every man has a feeling which he is unable to endure for others, and humanheartedness consists in extending this feeling even to things you can endure for others. Every man has a thing which he dares not do to others, and righteousness consists in extending this to things you can dare do to others."

From this, it can be seen that Mencius proposes two fundamental moral sentiments, humaneness or humanheartedness and righteousness, both of which are differentiations of the Confucian feeling of fellowship, or rather two phases of it. The Mencian *jên* is the affectional and esthetic aspect of the Confucian *jên*, while his *i* is its volitional and ethical aspect. One is love, grace, and subjective, while the other is duty, moral "ought," and an objective consideration for others. One is the expansion of the altruistic feeling, and the other is the inhibition of egoism, and thus each complements the other.

Thus, the Confucian fellow-feeling has undergone through Mencius a more analytical consideration and developed the teaching of his master into the form in which it has been handed down to posterity.

Though Confucianism can be said in a sense to be the Chinese philosophy and ethics, there were not lacking, especially in the Ante-Ch'in period, some other ethical teachings which were vigorously contesting supremacy

with Confucianism, and among them we can mention the Taoist Yang-Tze, Mu-Tze, and perhaps Hsün-Tze. Let us first expound the ethics of Laotzeanism, or Taoism as it is commonly designated.

ETHICS OF TAOISM.

The Wu Wei.

The Taoists were no doubt better metaphysicians but poorer moralists than the Confucians. Their system of moral teachings may be called negativistic egoism. For their main principle of conduct is to enjoy the bliss of life in a quiet solitary retirement, free from all worldly cares and relations, and by devoting all their time to a serene contemplation of nature in its absolute, eternal aspect, and not in its ever-struggling, ever-becoming activity. They are not selfish in the sense that they want to assert their own egotistic will over that of others. In fact, they strongly advocate the doctrine of non-resistance (*pu chêng chih tê*)[33] but they practise this not because of the general welfare of humanity but because of their own preservation and happiness and peace. Let people do whatever they like, and let them assert their own egoism in defiance of our own, but in the end they will be their own destroyers. For their egotism, instead of hurting non-resisting innocents, recoils upon themselves, as egotism is the moral boomerang. Lao-tze teaches: Let others have precedence, and lo! I am preserved. Or, in his own words: "The holy man puts himself behind and he comes to the front. He surrenders himself and he is preserved. Is it because he seeks not his self? For that reason, he accomplishes his self." (Chap. VII.) Here is the gist of the whole Taoist ethics.

When the Taoists are said to be egotistic, it is not

[33] 不爭之德

meant that they are grossly materialistic egotists who unblushingly affirm their hedonistic impulses. Far from it; they are harmless innocent recluses, who have no other desire than to be left alone, in order that they may continue their undisturbed meditation in a solitary cell. They have no particular desire either on this earth or after death. But they esteem for one thing their own self above all other things. They have no desire to sacrifice their all-precious self for the happiness of others. Indeed, they do not hanker after any worldliness, and have no craving for the vanity of vanities that is doomed to pass. But they seem to have cared very much for personal immortality, not after death but in this life. Lao-tze, Chwang-tze, and Lieh-tze all had a very exalted view on this matter. They intuitively knew that this life as it is lived is a manifestation of the Absolute and as such immortal, and, therefore, that there was no need of seeking immortality after death. The later Taoists, however, could not understand this mystic conception of life and immortality, and naturally upheld a corrupted, degenerated, and distorted view of immortal life on this earth. Some of the later Taoists even claimed that they knew the secret of preparing the elixir of immortality, which had first been discovered by their venerable master Lao-tze and transmitted guardedly through generations. This was the first great loophole through which the Taoists gradually fell into a hopeless system of crass popular superstitions.

The backbone of the Taoist egoism is *wu wei*.[34] This term is generally rendered by non-action, while non-assertion[35] in many cases gives a more correct sense of the original. *Wu wei* does not mean sitting idle and doing nothing. It means not to interfere with others' affairs.

Says Lao-tze (Ch. II): "Therefore, the holy man conducts his affairs with non-assertion; he practises the doc-

[34] 無爲 [35] This is Dr. Carus's term for *wu wei*.

trine of silence. All things are working and he does not refuse [to work with them]. All things are born [and so is he], but he does not claim ownership; all things are achieving [and so is he], but he is not presumptuous. His merits are accomplished, but he does not dwell in them."

Again, in Chapter LXIV: "He who asserts is defeated; he who seizes suffers loss. The holy man asserts not, therefore he is not defeated; he seizes not, therefore sustains no loss. People fail when they are nearly at the point of accomplishing the work they have undertaken; if they were as cautious in the end as in the beginning, they would be saved from failure. Therefore, the holy man desires not-desiring, prizes not the treasure that is unobtainable, learns not-learning, retires where the masses pass by; and thereby he assists in the natural development of all things, but he never dares asserting."

The doctrine of *Wu Wei* is in its passivity the ethics of femininism. It teaches submissive humiliation, moderation, meekness, and often nonchalance; though, according to Lao-tze, these things are not prized for their intrinsic virtue, but as the means of attaining the end of self-preservation or self-affirmation. "I do not dare assume lordship, but the position of a guest. I do not dare advance an inch but retreat a foot." (Ch. LXIX.) "Man is tender and weak at his birth, he is stark and rigid when dead. All things and grasses and trees are tender and feeble at their birth, but when dead they are dry and sear. Therefore, those that are stark and rigid are followers of death. Those that are tender and weak are followers of life. Therefore, a strong army does not win, and a strong tree grows to decay. The strong and great are cowered, the tender and weak are uplifted." (Ch. LXXVI.)

And again in Chapter LXXVIII,[36] says Lao-tze,

[36] Cp. Ch. XLIII. "The weakest under the heavens chases and drives the hardest under the heavens, and there is no space where it does not penetrate. For this reason I know the usefulness of not-doing (*wu wei*)."

"There is nothing under the heavens that excels water in tenderness and weakness, yet there is nothing that surpasses it in efficiency when attacking the hard and strong. This is known to everybody that the strong is conquered by the weak, that the rigid is conquered by the tender."

In spite of this emphasis placed on passive and negative egoism, the ethics of Lao-tze is not lacking in noble thoughts such as characterize Buddhism and Christianity. By these I mean such passages as the following: "The holy man has no fixed thought of his own, he makes the wishes of his people his own. Good ones I meet with goodness; not good ones I too meet with goodness; and thereby I gain goodness. Faithful ones I meet with faith, not faithful ones I too meet with faith; for thereby I gain faith." (Chap. XLIX.) "Requite hatred with virtue." (Chap. LXIII.) "I have a triple treasure. I hold this very precious. The first is compassion, the second is moderation, and the third is not to come in front before the world." (Chap. LXVII.)

Anarchism.

Lao-tze's doctrine of passivity, when positively stated, is to let things follow their own natural bent without any interference from outside. Masses have an inherent tendency to gravitate toward the center of the earth; men have an inborn desire to follow the course of the Tao, which is in them. Therefore, let them alone, do not yoke them with unnecessary rules and formalities. Things that are imposed from without acquire unnaturalness so that they are inevitably crippled. Lao-tze thus exclaims: "The more mandates and laws are enacted, the more there will be thieves and robbers." (Chap. LVII.) And Chwang-tze agrees with him by saying that, "if an end were put to sageness, and wisdom put away, the great robbers would cease to arise; if jade were put away and pearls broken to

bits, the small thieves would not appear." (Part II, sect. III, "Chü Chieh.") To quote Lao-tze again: "When the great Tao is obliterated, we have humaneness and righteousness. Prudence and circumspection appear, and we have much hypocrisy. When family relations no longer harmonize, we have filial piety and parental love. When the country and the clans decay through disorder, we have loyalty and allegiance. Abandon your saintliness, put away your prudence, and the people will gain a hundredfold. Abandon your humaneness, put away your righteousness, and the people will return to filial piety and paternal love. Abandon your scheming, put away your gains, and thieves and robbers will no longer exist." (Ch. XVIII.)

These are strong words and smack not a little of anarchism. In truth, when the ethics of Lao-tze is carried out to its logical extreme, it results in nothing but absolute anarchism. The Taoist metaphysicians of the Ante-Ch'in period unanimously advocate the doctrine of non-resistance and non-interference. They want to return to the primitive stage of civilization, when there were no laws or regulations whatever. Everybody is supposed by them to have then enjoyed the utmost individual freedom and to have been as yet unconscious of abusing it at the expense of another. History, however, does not prove that there was such a golden age in the remote past, but that, on the contrary, the struggle for existence among various tribes as well as within one and the same tribe was a universal phenomenon. But the Taoists refused to take notice of the fact; probably they took it for granted, as many other Chinese thinkers did, that there existed a universal peace and unbounded happiness in prehistoric times. Even if they might have been induced to doubt it in one way or another, they were willing to ignore it, in order that they might remain charmingly spellbound by imagination and vision-

ary retrospect. An anarchistic state of things was thus made their highest ideal of individual as well as social life.

The following allegory culled from the Chwang-tze (Part II, Sect. VII) very ingeniously illustrates the significance of *wu wei* in the Taoist ethics: "The ruler of the Southern Ocean was Shu, the ruler of the Northern Ocean was Hu, and the ruler of the Center was Chaos. Shu and Hu were continually meeting in the land of Chaos, who treated them very well. They consulted together how they might repay his kindness and said: 'Men all have seven orifices for the purpose of seeing, hearing, eating, and breathing, while this ruler alone has not one. Let us try and make them for him.' Accordingly they dug one orifice in him every day; and at the end of seven days Chaos died." Poor Chaos! If he were left in his chaotic, undetermined, undifferentiated, and, therefore, necessarily inactive (*wu wei*) condition, which was indeed the *raison d'être* of his existence, he could enjoy a life of eternity and of perfect contentedness too. The unnecessary, though quite well-meant, interference of his neighbors permanently put an end to his very existence.

Whatever the Taoist world-shunning ethics, it was a creation of the Chinese mind after all. It never lost sight of its practical import; that is, it always showed a considerable interest in politics and state-administration. The reader might imagine that an ethical doctrine such as that of Lao-tze would not trouble itself with political affairs, which are merely a product of the worldly wisdom and artificiality despised so strongly by the Taoists. But no Chinese philosopher and moral teacher would ever think of ignoring the practical consequences of his theory. Indeed, the value of a theory had to be judged by its working utility in the daily life of man as an individual and as a member of society.

Lao-tze's theory with regard to the administration of

state affairs, as can be expected, was a direct, unmodified application of his *wu wei*, and might be called a *laissez faire* policy. Give the people as much freedom as they want; let them not be encumbered with artificial formalities and excrescent regulations; leave them alone as much as possible; if necessary, deprive them of all craftiness, cunning, prudence they have acquired since the initiation of artificialities, and lead them to a state of primitive innocence and absolute artlessness. This policy, according to Lao-tze, is understood to secure the peace and good order that used to prevail in the olden times of "cord-knotting" administration. The people would be delighted with whatever they have, simple and plain. They would die natural deaths when they were old. The cocks and dogs would happily voice their perfect contentment all around the country. And here we have a perfect state of things that ought to exist when the natural course of the Tao is faithfully followed. (Tao Teh King, chap. LXXX.)

The reader will here notice how radical is the difference between the ethics of Confucius and Lao-tze. Some sinologists ascribe this difference to climatic variation, the former representing the type of vigorous, industrious, and order-loving Northerners, while the latter that of care-free, visionary, impulsive, and often indolent Southerners. Under the pressure of the rigorous climate and inclement weather, the Northerners have to fight hard against nature. With them the letting-alone policy will result in the annihilation of their own existence. But the case is entirely different with the Southerners, To them nature does not mean a force that is unfavorable to them and therefore to be conquered. On the contrary, she is so bountiful that they can enjoy fulness of life with hardly any toil. Non-resistance and non-interference are the best policy whereby they can deal with nature. For this reason, Confucius can be said to represent the Northern type and

Lao-tze the Southern. The history of Chinese thought is no more than the record of the struggles between these two rival conceptions, Taoism aided by Buddhism and frequently joined by popular superstitions, and Confucianism generally strongly proving to be the more representative and indigenous to the Chinese mind.

HEDONISTIC EGOISM.

The most rigorous expounder of a hedonistic egoism in the history of Ante-Ch'in philosophy was Yang-tze. He seems to have been very influential at times, and his doctrine exhibited a considerable force against Confucianism, and if it were not for the eloquence of a great genius like Mencius, it might have been able to defy its opponents for a long while yet. Yang-tze's doctrine proves to what extent the negativistic egoism of Lao-tze can degenerate. Properly speaking, Yang-tze was not a philosopher at all. He was an eccentric soul, perhaps mortally wounded by some political disappointment and wrongfully guided by his natural pessimistic bent. His doctrine, if it be so called, was not a mature result of serious reflection, but rather the incoherent utterance of a mind cruelly in despair at the outlook of humanity. But the tolerance, nay, the popular acceptance which was accorded to the wild explanations of Yang-tze, proves the Chinese minds in this period to be fertile, versatile, and ready to take up anything novel. Yang-tze's existence was at all possible only in those days. Had he appeared a few hundred years later, his sayings would have been forever buried in oblivion.

Yang-tze, or Yang-Chou[87] as he is sometimes called, did not leave any work of his own. Perhaps he did, but we know no existence of it now. All the data we have to-day of his life and utterances are contained in the Lieh-tze, the Mencius, the Chwang-tze, and the Han-pi-tze. From

[87] 揚朱

these it appears that Yang Chou was a younger contemporary of Lao-tze, and from him he seems to have received some instruction concerning life and virtue, which was somehow similar to that given to Confucius. It is, therefore, but natural that we can trace in Yang Chou's hedonism a distinct echo of Lao-tze's ethics of self-complacency. In the latter was a prevailing tone of quiet negativism, but in Yang Chou we have a positive insistance on ultra-egoism. Sharing with Taoists in ascetic spirit, he did not teach sensual debauchery as a principle, yet what he is regarded to have taught verges dangerously near it, and in some cases can be said to be practically amounting to the same. There is no reason, however, to believe that the author himself was a man of loose morals and easy virtue. He was no more than a recluse himself, disgusted with the world and its artificialities. And he was a satirist too. When he is seen in this light, his doctrine is not so offensive and despicable as charged by the Confucians.

The ground principle of Yang-tze's egoism[38] is, negatively, to shirk all the artificial restraints that are calculated to bridle the natural impulses of man, be they high or low, and, positively, to let him go back to a state of primitive naïveté and enjoy his blessed life to the full extent of his emotional capacity. Yang-tze, therefore, looks down at the Confucian doctrine of humaneness and righteousness as something forced upon human nature and not innate to it. The object of life is not to yoke ourselves to moral pillories such as were imposed by the Confucians, merely in order that posterity might have a good opinion of us. The object of life is to give the freest rein to our nature and gratify it to the utmost. For is not life short? and is not this short life even encumbered with all kinds of care and worry? Subtract from a man's life the years of

[38] What follows is condensed from Lieh-tze's work in which there is a chapter exclusively dealing with the views of Yang Chou.

babyhood and senility, and its half is gone. Then take away hours of sleep, and there remains only one-fourth of the entire length of our life, which rarely reaches the one hundred-year mark. But is this one-fourth filled with unalloyed joy and happiness? By no means, for are there not so many unnecessary things that threaten to cut off even this remaining fraction of life? Desires are consuming our corporeal strength; social traditions are crippling our moral simplicity; national prejudices are strangling freedom of action; laws and regulations are muzzling the expression of natural sentiments. Under these intolerable encumbrances how could we spend lightheartedly even the mere fraction of life that is granted to us? Therefore, says Yang-tze, let us abandon all things that are external and superfluous, and let us enjoy our natural, unhampered life to its full limits. People of olden times were perfectly aware of the shortness of life and wanted to make the best of it. They lived as dictated by their simple, innocent impulses. Their desire was to preserve the naïveté or integrity of their nature. They never worried themselves about things earthly. They never distorted or mutilated what they obtained from heaven merely for the acquisition of things artificial. They were above political intrigues, aspiration for fame, commercial greed, and other petty human concerns.

This self-abandoned indifference and transcendentalism distinctly echoes the teaching of Lao-tze. But Yang-tze was not a mere quietist. He sometimes actually endorses debauchery of the worst kind. His almost unconditional egoism does not allow him to extend his sphere of interest either to his fellow-beings that are thriving around him or to those that are to come after him. He is utterly indifferent to matters concerning others. He stands absolutely alone. He does not condescend to identify himself with other fellow individuals. Therefore, he scoffs at such

men of virtue as Shun, Yü, Chou Kung, and Kung Fu Tze (Confucius), who are universally revered by the Chinese; —he picks them out as examples of most unnatural men that worried and deformed themselves merely for the sake of a good name. Yang-tze, on the other hand, praises Chou and Chieh—the type of infamy and depravity—as men who had courage and even virtue to behave as their natural impulses dictated. What did it matter to them if they now stand for everything that is disgusting in man? They who are so vehemently condemned by posterity as well as such virtuous men as Shun and Confucius,—are they not all gone forever and aye? Are not their bones crumbling, their flesh and blood already mingled in the dust? Let posterity say of them whatever it pleases, both the censured and the praised are absolutely insensible. Honor or dishonor, are they not like bubbles on water? Why not enjoy all that is enjoyable while alive? Begone! our doctrinaires, hypocrites, unnatural moralists, and vain aspirants after fame!

"How then should life be taken care of?

"Indulge in what your ears desire to hear; indulge in what your eyes desire to see; indulge in what your nose desires to smell; indulge in what your mouth desires to speak; indulge in what your body desires to obtain; and indulge in what your mind desires to do.

"Now, sound is what the ears desire to hear, and when it is denied to them, it means crippling the auditory sense. Things beautiful are what the eyes desire to see, and when these are denied to them, it means crippling the visionary sense. Perfume is what the nose desires to smell, and when this is denied to it, it means crippling the olfactory sense. Judgment is what the mouth desires to speak, and when this is denied to it, it means crippling intelligence. Delicious food and warm clothing are what the body desires to have, and when these are denied to it, it means

crippling the sense of comfort. Freedom is what the mind desires to have, and when this is denied to it, it means crippling one's nature.

"All these cripplings are so many unnatural self-restraints, and he that has the fixed thought to do these, is molesting himself, is torturing himself. If you cast away the thought of self-molestation and lightheartedly and joyously indulge your passions and desires, and giving yourself up to the pursuit of pleasure calmly await the coming of death, your life of one day is equal to another's life of one month, and your life of one year to another's life of ten years. This is the way I take care of my life. Those who are yoked to the thought of self-molestation may have a long life of one hundred, ten hundred, even of ten thousand years, in a depressed state of mind, but what is the use of all that? It is not my way of taking care of life."

When judged from these passages alone, Yang-tze may appear a crass sensualist, a most vigorous libertine; but in other places we come across the typical Lao-tze doctrine of *Wu Wei* or the world-fleeing spirit of some Hindu philosophers.

"The reason why men are restive is due to four things: (1) longevity, (2) fame, (3) social position, and (4) wealth. People crave these things, and therefore they fear spiritual beings, their fellow-citizens, influences from unknown regions, and the punishment of the civil laws. They are called irrational and disobeying Heaven. Such people could be killed or saved at will by others, for they are not masters of themselves.

"Those who obey heavenly orders have no desire for longevity beyond the limit set by Heaven. They have no craving for fame as they have no thought of displaying their worth. They have no desire for social rank as they have no thought of abusing their power. They have no

desire for wealth as they are free from avarice. These people are called 'obedient.' The obedient people do not long for worldliness; they are independent, self-complacent; they are far above things earthly; they have destiny in their own hands and are free from all outward interference."

Taking all in all, he is not a debauchee but a self-contented, artless, simple-minded child of nature. He hates all kinds of inordinate excess and artificiality. He wants to live as he came from the bosom of eternity. He has not the slightest craving for sensual pleasures beyond the demands of nature. He feels hungry, and eats a morsel of coarse bread, and he is satisfied. He is cold, and puts on one more woolen tunic, and he is comfortable. He is a fatalist. He calmly greets death. He has no desire for immortality, either in life or after death. In these respects he deeply breathes the spirit of Lao-tze.

Whatever the merits and faults of his extreme doctrine, he occupies a unique position in Chinese philosophy. In his days and immediately after his death, he seems to have had quite a sway over the Chinese minds as we read in Mencius (toward the end of Book VI): "As a sage-king does not rise, the lords and dukes are unrestrained, private scholars are too liberal in their discussions, and the doctrines of Yang Chou and Mu Ti are pervading everywhere. When the general public is not swayed by Yang, it is swayed by Mu. The Yang asserts egoism, ignoring sovereignity; and the Mu asserts ultra-altruism, ignoring paternity. Without sovereignity and paternity, we all become lower animals."

UTILITARIANISM.

Almost all Chinese ethical doctrines are more or less characterized by a strong utilitarian tendency, for practicality is the key that opens one of the main entrances to

the Chinese mind. But there are, too, other moral traits predominant and peculiar to them. For instance, filial devotion is practically the corner-stone of later Confucianism; ceremonialism also occupies a conspicuous part in Chinese life; and lastly, there is a persistent assertion of conservative spirit in all their doings, and this spirit naturally makes the Chinese great lovers of peace. As all these racial characteristics have claimed their due consideration in the formation of their national system, their utilitarian tendency had to be modified to a certain extent. Therefore, it is a matter of self-evidence that we recognize in Confucianism a harmonious blending of all the predominant traits of the Chinese mind; for, otherwise, it would have been neglected like so many other doctrines, and would not have filled the position which it has held almost without an interruption since its first establishment. The doctrine I am going to consider, on the other hand, overlooked the importance of all the Chinese peculiarities other than utilitarianism and practicality. It unduly emphasized this phase, which necessarily resulted in an utter disregard of all the other things.[39] The doctrine is commonly known as an ultra-altruism in contradiction to the ultra-egoism of Yang-tze, but, properly speaking, its fundamental principle is no more than utilitarianism. It also contains many conceptions which are closely similar to Christianity, and it is very probable that if it were reared by a people who were more idealistic, imaginative, and above all religious, it could have developed a system almost like Christianity.

[39] Says Mencius (Book XIII): "With Yang-tze egoism is everything. Even when he could benefit other people by sparing one bit of his hair, he would not do that. With Mu-tze altruism is everything. If by rubbing himself from forehead to heel he could benefit other people, he would do so. Tze-Mo adheres to the mean. The adhering to the mean is nearer [to the truth]. But if, in adhering to the mean, the weights are missed to keep balance, it is just as bad as adhering to the extremes. The reason why the extremists are condemned is that they mutilate the [whole] Tao, that they raise one point [too high] at the expense of a hundred others."

The author of this interesting doctrine is Mu Ti.[40] Records vary as to his nativity and age, but the probability is that he was a younger contemporary of Confucius and flourished about the time when most of his immediate disciples were gone. His home seems to have been in the South and not in the North. He held an official position like every other learned man of the country. His work[41] now in our possession consists of fifty-three books or chapters. Originally there were some more books in it. It seems most of the fifty-three books were written by his personal disciples after his death, but some of them are utterly unintelligible now, owing to some textual discrepancies and corruptions, and many desperate attempts were made to adjust them, though practically to no purpose. But the other parts are free from obscurity and show in many respects a clear logical mind on the part of the author, something unusual in Chinese philosophers.

The ideal of Mu Ti is universal peace and universal prosperity. Whatever his teachings, they are all intended to bring about this state of things. He declares that the business of the holy man consists in fostering peace among his people, in developing all the resources of nature, and in avoiding all the possible causes of evils that befall our community. It is wonderful to notice how modern are these views of the old Chinese philosopher Mu Ti. He asks: "Why is the existing state of things far from this ideal?" "Because," answers he, " everybody esteems his own self above others." The strong usurp the rights of the weak, the crafty take advantage of the ignorant, officers abuse their power over the unprotected, powerful states absorb the helpless. For these reasons, we are constantly in a state of war, individual with individual, family with family, clan with clan, and state with state. This cannot

[40] 墨翟

[41] To my knowledge there exists no English translation of the work.

be the destiny of humanity as ordained by the will of heaven, which is our ultimate source of authority. Let one love another as one's own self, let a nation love another as its own, let a sovereign love his subjects as himself, let the son love his parents as himself, let everybody love everybody as himself. Then there will be no traitors who love themselves at the expense of the state to which they belong; there will be no tyrant who ignores the welfare of his subjects; no robbery, no enmity, no inhumanity; in fact there will be no evil that will disturb universal peace ensuing from this practice of universal love. (Chapter XiV and XV.)

How is the principle of universal love and mutual benefit justified? Mu Ti argues that there are three methods of testing the soundness of a principle. First, it must conform to the will of heaven and be in accordance with the doings of ancient sages; secondly, our daily experiences must justify it; and thirdly, when it is made into a law and practiced among the people, it must prove an agent for the general welfare. (Ch. XXXVI-XXXVII.) Mu Ti proceeds to prove all these points in this way. Heaven created the sun, moon, and innumerable stars. It regulates their courses and the four seasons follow in order. It sends forth thunder and lightning, rain and snow. Warmed by them the five cereals and other nourishing and useful plants grow. People avail themselves of these heavenly gifts. Again, there are mountains covered with all useful trees and stored with all wealth-producing metals. People transform them into their own service and make themselves comfortable in every way. Again, there are sovereigns and wise men specially favored by heaven. They make laws and administer to the needs of the people; the wicked are punished, the ignorant are made enlightened, and prosperity is secured. Do not all these things come from the will of heaven? Do not all these things come to

everybody without discrimination? Why, then, heaven must be considered the source of love and righteousness, and our duty on earth is but to follow this will and practice universal love and mutual benefit. (Chap. XXVII.)

And was this not also the teaching and practice of the ancient sages?

Our daily experiences teach us the same lesson. Those who love are loved, those who hate are hated. If we benefit others, they are glad to return the favor; if we rob them of what is due to them, they will be ready to requite in a similar way. This is what we observe all around us. (Ch. XIV.)

If we make this heavenly will the principle of administration, the sovereign will be beneficent, the subject loyal, the father kindhearted, the child filial, the elder brother friendly, and the younger dutiful. Good or evil, the source of influence is from above. There was once a king who liked slender waists, and every woman in the state deprived herself of necessary food. There was another king who delighted in muscular strength, and every youth in the state devoted himself to all kinds of athletic exercises. Therefore, nobody can tell to what extremity the masses will rush when an example is shown by the privileged classes. Let the sovereign and his officers exercise the will of heaven as is manifested about us, and the entire nation will at once follow suit. Universal peace and eternal prosperity will then inevitably be the outcome. (Chap. XV.)

The real issue of Mu Ti's doctrine, however, seems to lie more in its utilitarian aspect than in its humanistic side. This can be seen from his economic views which brought about the vehement accusations[42] of the Confu-

[42] "The refuting of the arguments of Yang and Mu should be like the taming of the wild hogs. After they have been put in a pen, they should be bound fast." (Mencius, Book XIV.) In another place (Book VI) he again compares them to the lower animals.

cians resulting in the final downfall of his whole system. He rigorously opposed the prevalence of luxurious habits as to dwelling, clothing, eating, and traveling; and he also condemned the custom of concubinage. They are all the unproductive consumption of wealth; so much is spent and nothing material is gained thereby. The real happiness of the masses does not consist in the encouragement of luxury but in the production of wealth.

The custom of concubinage naturally results in the overproduction of bachelors as well as old maids,—the fact will eventually threaten the growth of population.

On the same ground, Mu Ti objected to the Confucian sentimentalism. The Chinese always cherished a very deep reverence for their ancestors and lost no opportunity to show the feeling in public. Their burial ceremony, therefore, was naturally of the most elaborate character. There was a strong tendency among the poor as well as the rich to go beyond their means, in order to express or make a show of the deepest reverence and sympathy for their deceased. We learn from modern travelers that there are in China some professional mourners who are hired by real mourners to make their funeral procession appear more mournful by their simulating show of lamentation. The Chinese of olden times perhaps did not take such an extreme step to make a public exhibition of their grief; at least we are not in possession of any documents to prove this. But they were certainly ready to acknowledge the highest type of filial devotion in those who remained in mourning for at least three years for their deceased parents. During this long period,[43] they lived a most secluded life, they retired from public offices if they held

[43] In the Confucian Analects, XVII, 21, one of his disciples wants to shorten the mourning period from three years to one. While his argument is very rational, the master refuses to agree with him on a sentimental ground, which, however, seems to be somewhat too far-fetched and is not at all convincing.

any: they did not attend to any commercial transaction; they refrained from participating in any public or private festivals. They remained at home like a prisoner or a religious recluse, fixing all their pious thoughts on the memory of their deceased. This was what was generally endorsed by the followers of Confucianism as a pious expression of filial devotion; and this was what was most strenuously opposed by Mu Ti. (See the Mu Ti, Chapter XXV.)

His objections were on the whole sound and well-grounded. He demonstrated that there was no sense in wasting wealth on such unproductive things as funerals; that such a protracted observation of mourning tended to paralyse the administration of the government and to check the progress of industry and commerce. It is not necessary at all to wrap a corpse in extra clothes, to put it in an extraordinarily strong coffin, and to inter it in an unduly deep grave. All we have to consider in these matters is the practical end which they are intended to serve. Mu Ti was a thorough utilitarian and refused to yield to any sentimental extravagances. He did not disregard the significance of sentiment, he was willing to pay due regard to it, but he could not bear to see the national and individual wealth scattered to the winds for the sake of mere sentimentalism.

It is, therefore, no wonder that Mu Ti was also against music (Chapter XXXII) and vigorously condemned war (Chapters XVII, XVIII, and XIX). In his opinion, music did not add an iota to the national wealth and prosperity; and as to war, it was simply abominable; every trade and industry comes to a standstill, and every sense of justice and righteousness is thereby hopelessly benumbed. At any rate, anything that will disturb the peace of a nation and destroy its productive facilities is mercilessly attacked by Mu Ti.

A fatalistic doctrine which seems to have been prevalent in his days could also not escape his condemnation. According to him, fatalism was a great obstacle in the way of industry and prosperity. If the people were abandoned to the so-called fate which is predetermined and beyond human control, there would be no incentive to urge them to work, produce wealth, and preserve permanent peace. On the other hand, everybody would remain perfectly passive and utterly inactive leaving everything to the pre-established order of things as regulated in the beginning by Unknown Destiny. This state of things could never be suffered to exist in this world of striving. Mu Ti was a strong advocate of the strenuous life and untiring energy. In him we see the practical tendency of the Chinese mind singularly emphasized, though at the expense of their love of formalism and ceremonialism. (See Chapters XXXV, XXXVI, and XXXVII.)

Finally, what is significant in Mu Ti is his conception of *T'ien* which means literally "heaven," but can be freely translated by "God" even in its Christian sense. The difference between the Christian God and Mu Ti's Heaven (*t'ien*) is that while the former made the conception of God foremost and its worship the paramount issue of the religious life, the latter conceded the first place to utilitarianism, for the execution of which the God-idea became necessary to him. It will no doubt be very interesting to consider at length Mu Ti's conception of Heaven in its connection with his doctrine of universal love, which is so closely akin to Christianity. This will be done later on when the religious side of Chinese thought claims our attention.

CEREMONIALISM.

As might be expected, there was a virulent attack upon the ultra-utilitarianism of Mu Ti. The Chinese love of

ceremony and their strong sentiment of ancestor-worship prevented them from giving themselves up to philosophical simplicity or making an unconditional surrender to utilitarianism. This antagonistic spirit found its spokesman in Hsün-tze,[44] who flourished several decades later than Mencius. He left a work consisting of thirty-three books or chapters. He was not such a brilliant genius as his predecessors such as Mencius or Chwang-tze, but his method of reasoning was singularly sound and systematic for a Chinese. (So far as I know, there exists no English translation of the Hsün-Tze.)

The Confucians of later days treat Hsün-tze as if he were a stepson not properly belonging to the orthodox lineage of Confucianism. This is due to his doctrine of the innate badness of human nature, which he forcibly set forth against the opposite view held by Mencius. Since Han Yü (A. D. 768-824), an eminent scholar and writer of the T'ang dynasty, pronounced Mencius, in place of of Hsün-tze, as the transmitter of the orthodox Confucian teachings at the end of the Ante-Ch'in period, Hsün-tze lost his legitimate position and consideration in the eyes of the general public. But from a scholarly point of view, he is entitled to a prominent place in the development of Confucianism, not a whit less than his eloquent predecessor Mencius.

From the historical point of view, what Hsün-tze did for Confucianism was to emphasize its ceremonial side, while Mencius strongly developed its humanistic side. In the Confucian Analects itself, it is sometimes doubtful whether the Master means to give more importance to ceremonialism than to human-heartedness (*jên*). His almost congenital fondness for rituals and ceremonies was so remarkable that it caused his biographers to record that "In his childhood Confucius used to play with the

sacrificial bowls and dishes which he arranged with due formalities." In Book X of the Analects, the reader will notice how carefully and minutely is described the Master's every manner and behavior on different occasions, as if he were the living embodiment of all that was proper in life. The main motive of his interview with Lao-tze was to inquire about ceremonial usages, formally recorded or not, which were kept in the archives of the Chou dynasty, of which Lao-tze was the custodian. And his contemporaries seem to have acknowledged him as authority on matters sacrificial and ceremonial.

Confucius was an ardent advocate of ceremonialism not only in its outward expressions but in its morally edifying effects on character. In the same sense Pascal urged a strict observance of all the church rituals as finally conducing to the development of piety and general Christian disposition. Confucius deplored the universal decline of ceremonial spirit in his days, and did not miss the opportunity to declare his disapproval. If such a powerful, brilliant, and extraordinary person as Mencius failed to come after the Master and proclaim the ethical, subjective, humanitarian side of his doctrine, Hsün-tze, promoter of ceremonialism, would have been recognized as representing the orthodox school of Confucianism.

What was most fatal to the popularity of Hsün-tze was perhaps due to his radical view of human nature, which, in contrast to Mencius, he considered essentially bad, and which, therefore, needed correction through the rules of propriety especially invented for this purpose by the ancient sages.

But, strictly speaking, this unflattering conception of human nature was not of so much importance to Hsün-tze as his ceremonialism. His object was to give a philosophical foundation to his ethics, which he based on the crookedness of humanity which needed rectification. As other

Chinese thinkers, Hsün-tze always kept before his eyes the practical side of his philosophy. His aim was to lead the people to the path of perfect virtue; and to attain it ceremonialism was introduced as the best means. It was not of much consequence, practically considered, whether humanity in its innate constitution was theoretically bad or good; the main thing was to follow the Confucian codes of morality. And in the course of this study, we might say, he incidentally found out that human nature was not good after all as claimed by Mencius; for if it were, he reasoned, why did it need rectifying at all through moral discipline and the rules of propriety?

Says Hsün-tze: "Every one has inborn desires. When these desires are not satisfied, he looks around for the objects [of satisfaction]. When no measure and limits are set to this searching, there necessarily arises quarreling. Quarreling means disturbance, and disturbance obstruction. Wise men of old hated this disturbance; therefore, they established the rules of propriety and justice. They imposed them upon the people. Their desires were thus regulated and their requirements thus furnished. Every desire was not allowed to be satisfied, and every satisfaction to lead to a new one. The equilibrium between them was constantly kept under control. This is the beginning of the proprieties."

From this, it is apparent that Hsün-tze considered society an artificial institution. When men were left to themselves, they fought against one another, for each endeavors to have his own desires satisfied without any regard to his neighbor's. But somehow it occurred in the mind of a wise man that this constant disturbance was not a very desirable state of affairs. The people must be put together in groups, and to insure peace among them some definite checks must be placed on their never-satiated desires. He knew that this procedure was against their

nature, that those checks meant the curbing of their wild desires and impulses, that this was an artificial invention contrary to human nature. Therefore, the holy man, according to Hsün-tze, was no more than a perfected type of artificiality.[45] The difference between him and the masses of the people was not due to their innate character, but to the artificial refinement that is given to the original raw material.

Here comes the most pronounced difference between Hsün-tze and other Confucians in their practical system of moral discipline. Tze Ssu (grandson of Confucius), Tsêng-tze (one of the Confucian apostles), Mencius, and other principal Confucians show an unanimous tendency to lay more importance on the inner significance of *Jên*, humanism, and *Ching*, reverence, considering the rules of propriety as a natural outward growth of the inner sentiment. But Hsün-tze did not believe in the goodness of human nature and could not rely on its self-cultivation. To use modern terms, he strongly believed in the overwhelming influence of environment in shaping a man's character and destiny. The human mind was not a blank sheet of paper on which anything could be patterned. It was, on the contrary, a very rough substance which needed the most careful handling and systematic remodeling. Rigid rules of propriety artificially laid down by the wise men of old had to be applied on the original raw material, hewing off all its ruggedness, smoothly polishing it up to a required shape.

By this artificial remodeling, the hungry could be persuaded to give precedence to the older, the tired to endure their hardships, brothers to agree in the distribution of their ancestral property, and the people to show due consideration even to strangers. All this excellent behavior is not a spontaneous exhibition of the sentiment as har-

[45] 積僞而化

bored in the heart of the natural man, but is due to the beautiful influence of ceremonialism.

If other Confucians are to be classified as upholders of subjectivism, Hsün-tze was no doubt a decided proclaimer of objectivism. He did not believe in evolving goodness from within, but in grafting it from without. He did not believe in the cultivation of the altruistic impulse called feeling of fellowship or humaneness (*jên*), but in the muzzling of egotism by some artificial method. When we remember what powerful factors are traditions and the instinct of imitation in the upbuilding of society, it is undeniably true that Hsün-tze's objective method of moral training, however onesided, is conducive in many cases to the making of a high moral character.

Ceremonies, formulas, and rules prescribed by religion or tradition are the natural outward manifestations of some inner sentiments felt by wise and virtuous men of ancient times and sanctioned by all the following generations as elevating and hallowing. When those established rules are reversed in order, and, instead of letting them come from within, are forced upon a human heart from without, it can logically be expected that they will produce in the receiving organ similar sentiments and impulses to those that stirred within ancient men of piety and virtue. The human heart is made of so many susceptible strings, and each of them responds to a certain note. If they are not strong and original enough to vibrate automatically from within, they can be made to act in a definite way by some mechanical means from without. And that is the psychology of ceremonialism.

In one sense the view of the later Confucians who find in Hsün-tze a seed of heterodoxy can be justified, for he opposed the idealistic undercurrent in Confucianism which was very precious to most of its adherents. Says Hsün-tze: "Moral training cannot gain a step by mere retro-

spection; let a man studiously apply himself to [practical] discipline [or study].[46] The one whole day spent in meditation does not equal in merit to the one minute of [practical] study. We may stand a-tip-toe as high as possible; but it is far better to go up to some height and look round far and wide. Climb up higher and wave your hands; your arms have not gained an inch, but they are seen from afar. Raise your voice in the direction of the wind; it is not necessarily strong, but it can be heard distinctly. Wise men do not differ in their nature from others. What makes them wise is due to their adaptation to environment. Therefore, wise men are particular in choosing their place of dwelling and their associates, for things are grouped according to their congeniality. Let us study all the records bequeathed by our ancient sages and practice them in our daily life. What is the most essential of all things, however, is the study and observance of rules of propriety. This is the consummation of all studies and the culmination of all virtues." As to the study and importance of the canonical books Hsün-tze was in perfect agreement with all the other Confucians. But he considered the book of ceremonies or proprieties to be of special significance. There are, generally speaking, two opposite tendencies in the history of philosophy, one is subjectivism and the other objectivism. In the Chinese history of thought, Hsün-tze represented the latter and strongly emphasized the importance of ceremonial formalities.

It is, therefore, quite in keeping with his general principle that again in opposition to Mu-tze, he laid great emphasis on the importance of music. Mu-tze saw in music its economical unproductiveness only and ignored its soothing and refining effect on the sentiment. Hsün-tze was always

[46] A similar view was also expressed by Confucius himself in the Analects; for he says: "Once I fasted the whole day and did not sleep the whole night, all the time engaged in thinking. It was of no use, however. Nothing is like study, [that is to say, practical discipline]."

bent on cultivating the character by all possible external means, among which music must be considered one of the most potent. In this respect Hsün-tze certainly voiced one of the sentiments remarkably characteristic of the Chinese. One of the main reasons, however, why they did not favor him so much as Mencius, is, as said before, owing to his peculiar conception concerning the original nature of humanity. Whatever selfish and bestial impulses and thoughts we may betray in our daily intercourse with our fellow-creatures, we are innately inclined not to conceive ourselves as radically base in character. Our fundamental belief, though at first unconscious, is that we are capable as well of absolutely disinterested impulses and thoughts and actions. And our experiences prove that our faith in ourselves, though subjectively formulated at the beginning, stands on some irrefutable objective facts. The Chinese with their highly cultivated common sense naturally shrank from Hsün-tze's conception of human nature, while in other points he was a spokesman of their characteristic sentiments.

Another factor that tends to prejudice Hsün-tze in the eyes of the Chinese public, lies perhaps in his style of writing. What makes a thought acceptable generally, is not always determined by its genuine worth, but in many cases by the manner in which it is presented. For even a worn-out idea becomes agreeably acceptable when it is garbed in a new style. Hsün-tze stands far below Mencius in this respect. His reasoning was unusually powerful and exact and logical as compared with Mencius's, but the form in which his thought was embodied was not so brilliant and eloquent and charmingly attractive as the latter's. It cannot be denied, as we see to-day, that the premises and conclusions of these two great ancient philosophers are defective and onesided and do not cover the entire field; but judging from their rhetorical effects, Mencius appeals

more irresistibly even to the readers of these latter days: and it is no wonder that intellectual Hsün was treated by his compatriots as though he were without the pale of the holy teaching of Confucius, who was the ultimate authority in matters moral as well as religious to the people of the Middle Kingdom.

D. Teitaro Sużuki.

SOME DANGEROUS TENDENCIES OF MODERN MATERIALISTIC PSYCHOLOGY.

TO one trained under the old spiritistic conception of the universe and man, to whom the world of life and law seems instinct with Supreme Intelligence and man a being with capacity and destiny approaching the Supreme, it is a positive shock and even grief to note the efforts of the modern psychologist to drive God back into Spencer's Unknowable and strip man of all that makes him better than a splendid brute, that leaves him nothing but a bundle of highly developed material nerve re-actions from outward sensations, differentiated from the brute and from all other men only by his individual, peculiar re-actions, whose being is only a "stream of experiences" or "states of consciousness" and whose ego is only some supreme, isolated thought that perceives and masters all the rest.

Memory, his most precious possession, is only the tendency of his nervous organism to reproduce an impression once received with its associated circumstances, of the re-actions of nerve substance to follow the paths cut by preceding sensations. These re-actions are recognized and stored by no inner being but by the nervous organism itself.

Imagination, that delightful faculty to conceive new relations and combinations of old things and fashion them into strange and beautiful forms, is only an enlarged and

freely modified phase of memory, an elastic application of habit to aerial, subterranean and lateral locomotion.

The objective Me, the Self I am conscious of and recognize, is only "an empirical aggregate of things objectively known," i. e., is only an aggregate of all the sensations or re-actions felt in my whole nerve-structure which I recognize, by the "warmth" and "pleasure" with which I greet them, as parts and parcels of myself.

And the subjective I, the Self that feels and knows and dominates the whole being, is only one transcendent thought of thoughts; nay, is not even this, but only the dominant thought, at any given instant, of "a stream of thought, all the past thoughts of which, it, the temporary dominant thought, can recall and recognize as parts of the objective Me"! If this be not thinning out the personality until it have little positive content: what is it?

"It," we are gravely told, "is a thought at each moment different from that of the last thought (or any preceding or present thought) but *appropriative of* the latter together with all that the latter called its own." How very lucid and simple! What can we think of the mind that has such a "state of consciousness" as to postulate such stuff as this?

I am truly a passing, momentary Thought different from all other thoughts and absolutely unattached to the series from which I am singled out! I am not the same Thought for any conceivable instant of time but merely a constantly changing Thought. If I, the Thought, should stop changing for a millionth part of a second, the continuity of existence would be forever broken and I should be no longer I; but a new Thought must single itself out for the dominant one and I be forever another. This may be the rationale of some forms of insanity, the broken thoughts being a broken personality!

Passing thoughts are then the only ego, or "knower"

which the modern natural science of psychology need recognize. So much the worse for psychology—to study a soul without a soul, to start and stop at the unknowable, to explain only so much of soul-phenomena as depend upon the physical organism through and by which they manifest themselves and call it soulogogy is the bigotry of the scientist compared with which the bigotry of the religionist and spiritist is refreshing and satisfying.

I suppose that no intelligent student of philosophy today will deny the immense help he has derived from the modern form of the doctrine of development called evolution, but on the contrary will gladly own the great aid it is rendering in explaining much that was formerly obscure. And the investigations of the modern physicist are of incalculable value in revealing the methods of soul manifestation and activity. But to the student of psychology it is sheer suicide to adopt the theory of the extreme school of naturalists, that "we have no need of soul and God as yet, but hope to do without them to the very end."

This may be true as far as physical processes can yet be traced, but they all end at a point where we can go no further without assuming an indwelling intelligence that is more than abstract, ideal Thought however related to matter. And psychology can no more exist without allowing this than we can explain the phenomena of the organized body without assuming life—it will not be psychology.

We have no quarrel with the prevailing school as to its doctrine of the sense origin of our ideas. The age-long, hackneyed disputation over innate ideas does not concern us here. We grant too the truth of their discoveries of the mode of nerve-action and re-action in making up the sum of our knowledge and the localizing of special function in appropriate portions of the brain and ganglia. We admit too the correctness of their deductions, so far as known, as to the behavior of the nerve-organization under stress

of the various phenomena known as perception, memory, imagination, reasoning, emotion etc., but we hold that these are modes of manifestation and not the causation of the real man, the Ego. We hold that the I is something more than a specialized, differentiated product of nerve-action.

And though the Ego is born with and nourished by and develops by means of the nerve-organism, it is yet a thing so apart from and controlling of the organism as to be no passive product of its fortuitous activities, but a personality ruling it. If this were not so, the ego would be the chance production of miscellaneous, accidental, sense-impressions, quite unrelated to its own past expressed in terms of heredity, to its own integrity as an individual or to any tendency to conformity to type. A man thus produced would be a pure freak, an anomaly, an incalculable monstrosity.

In all growths in nature there must be germ, environment and life; but there must be more, else the germ might be a dog or ape or horse or man or a nondescript, as chanced. There is something in the germ that determines this and that something is in matter but as we claim, is not matter. It has never been found to be a characteristic of matter, but is always present in growing organisms and determines the form and uses of the organism through all the stages of its visible life.

It is found that the physical organism which is so intimately associated with mind as to be called the physical basis of mind, is developed from some preexisting germ of nerve matter and does not spring spontaneously from any chance combination of matter. How much mind this germ must contain is expressed by the phrase: "any mind at all," a mere sensitive spot, it may be, on the surface of the lowest form of animal matter. But however slight the starting point there is in it always a something pre-

existing but all controlling, which determines what the future character of the developing organism shall be. And there is sufficient evidence that that something is not a mere attribute of matter; but it is the organizing force or agency that predetermines the essential character of the living being.

But it must preexist and be continually acting throughout the career of the being. To conceive this something as mere abstract thought is unsatisfactory, and to personify this thought, for want of a better symbol, does not help us any. Since its first entry into the visible world (which we do not explain) it has been transmissible by inheritance and only by inheritance.

A study of the phenomena of impregnation and birth impresses upon our reason the necessity for this something with irresistible force.

The earliest and simplest traceable forms of living things is the cell which, bursting under stress, exudes materials to form another similar and close-adherent cell thus building up the organism with all its marvelous capacities and adaptations. But the power to grow is not an attribute of the cell substance but an entirely separate, differing something dwelling within the cell, called nucleus. This nucleus is not, as was formerly supposed, a modification of cell substance but as different from it as the man who dwells within a house is different from the house. And it is endowed with most complex and intelligent activities which control and shape all the changes in the cell. All cells do not contain a nucleus; but all do that have the power of living and reproducing themselves.

This nucleus contains something that is identical with that of the remotest parent stock ages back in time—in the nucleus I possess some of the very substance of the first ancestor of man. And this substance was as perfect in the first man as it is with me, though the cell substance was

much cruder than now and has been developing under the influence of the vitality of the nucleus ever since. It is the intelligent, purposeful domination inherent in the nucleus that does all the selecting, assimilating and developing of the materials that make up the organism and determine what it shall become.

The lowest and the highest forms of living matter are ruled by the same something resident and innate in these nuclei. With the nucleus we reach the ultimate bounds of the visible—here the Unseen begins where all lines of visible activity end, but whence all energy proceeds.

Now in psychology, the nerve organism is built up by the unseen energy, resident in the cell-nuclei to be the organism of manifestation of intelligence, and only on this assumption is it possible to account for the existence of mind. The causation of mental phenomena is as much a psychological question as its mode and machinery of operation; but the natural psychologist does not like to deal with causation since it is not so susceptible of discovery and demonstration as modality.

Modality is visible; causation is invisible. But the uttermost refinement of modality no more reveals causality than the coarsest specimen of crude matter. The cleft between them is unbridgeable now as in the earlier days of philosophical speculation. Natural psychology has contributed nothing to enlighten us as to causality. If this were all, we should have no quarrel with modern psychology; but it does claim to find something that answers its need of a final cause and calls it "streams" or "states of consciousness" all-sufficient in itself to account for the mind and its phenomena.

Does it? Can it? Can a mere habit of a sensitized nerve-system, plus its associated accumulations of sense impressions, account for both the memory and the memorizer? Vast deeps of erudition are stirred up to illustrate

the way in which memory acts; but does that reveal the one who remembers, who stores up the recollections, classifies them, deduces from them new facts and thoughts and fancies, who uses memory as a method and instrument for many purposes beside mere satisfaction of pleasure?

Can any transcendent Thought related or unrelated to any "states of consciousness" of the nerve-system, account for the being and doing of a Man? After all such theorizing is exhausted, do we not still find ourselves before a dead, blank wall where mystery begins and is not helped by chemistry or mechanics? Had the supposed discovery, in Huxley's day, of a diffused mass of pure undifferentiated protoplasm in the deep sea, been true, was there not necessary beside, an external stimulus and shaping force to arouse and guide its evolution into any form of organic unity? Otherwise it would lie there inert, inorganic forever. But there was no such discovery: there has never been found any undifferentiated, organic living matter anywhere. It always contains the stimulus and shaping force dwelling in it but not of it. And this is true of all living matter gray or white or yellow, nerve or muscle or bone.

We attribute the development of type and function in muscle matter to the influence transmitted by the nerves and external stimulus; and in precisely the same way, the development of nerve type and function is dependent upon external stimulus. In both cases, we can discover only the machinery for control. Yet we have no reason for supposing that the controlling force is not the same in each case; for it is invisible in any case—only the machinery is ever visible. Roughly speaking, the nerve-system is like a telegraph system; we see its results and part of its machinery, but the currents that come and go and the sender we cannot see.

To limit the science of psychology to effects and machinery and to ignore the inner currents and the controlling

Personality, is as unfair and unreasonable as to ignore electricity and the operator, in a description of the telegraph.

And what does modern psychology claim to have discovered? Why, merely that nothing comes from within outward, making use of our physical organism to reveal its thoughts and ideals, its hopes and aspirations to make man and the world better than the beast and his jungle. On the contrary, all we can know and feel must come the other way from without inward by means of physical highways. Only sensual impressions of a sensual world can reach us and make us what we are.

The poet, artist, thinker are unnatural, disordered reactions from the impressions of the outer world. The great intellectual idealistic outbursts from Sir Thomas More to Shakespeare, we are told, was the excitement of the nervous system due to the tertiary effects of the epidemic of syphilis! All characteristics not purely animal are disorders of the nervous system.

"Let us eat, drink and be merry; for to-morrow we die." There is no "I" but an abstract thought isolating itself from a "stream of thought" or "states of consciousness" and all our enjoyment is but the "warmth" or "oneness" with which we recognize a familiar sensation. There is no God for us, because he is not known by the senses, and we can know nothing any other way.

This only means that all the ideals of the race, the thoughts of spiritual goodness and hopes of nobler things, of all the past, are false and deceiving, are disorders of health. Mankind has aspired for ages for nothing. Men and women have striven and lived and died for a will-o'-the-wisp and only now have learned their wasteful folly. Let all men know that, as the French physician said: "The farce is played out."

It only means that life for man is a terrible outrage.

To evolve to a point just enough above other brutes to have grand thoughts, to try to become better still, to long for the true and the beautiful in life and destiny, to seek justice and holiness, to yearn for spiritual perfection, to give life freely in the firm hope of immortality, to struggle painfully up to what we are—and then to find that, in the very nature of things, it cannot be—this I say is a cruel joke of Destiny.

A mass of nerve matter in an iron cask, awaiting agitation through the bunghole; a flask of gases needing only an electric spark to cause re-action and combination, are as capable of original, mental action and the acquisition of personalitiy as the man of modern psychology.

I cannot think: I can only recall or re-create certain former impressions or sensations and recognize, combine, analyze and modify them so that they will cut a new pathway in my nerve-mass, and call this state, this mongrel thing, a process of thought. Any time this same process is repeated, I am said to *remember* my thought. If I am able to cause this process to repeat itself without the aid of any new external sensation, I am said to *imagine*. If it come back unbidden and without effort, I *dream*. And so all the wonderful acts of the mind, all that makes life worth living, all that makes our existence bright and good and beautiful are explained and interpreted—and the hope of man is destroyed.

And thus we make the frightful and astonishing discovery that all the great and beautiful things man has ever written, all Bibles, all literatures are mere drivel. Indeed it is hard to see how it was ever written at all if there is nothing in man but what reached him by his senses, if he is but a bundle of nerve-cells organized by material sensation, if he cannot originate anything, if he may not inspire anything but material effluvium, if he has no mode of communication with spirit or with God.

I myself have all my life been dreaming of the evolution of man into a higher state; let me dream no more. I had hoped that I might aid in raising him a little nearer to the angels, a little further from the source of animal temptation and unholy passion; but I hope no longer. I saw, or thought I saw a coming kingdom of kindness, justice, love, wherein no man however lowly was doomed to sorrow and despair: the vision strangely fades and all I see is now a valley of dry bones whereon no spirit-breath shall ever blow. I had enjoyed to look upon the summer sunset or a copy made by man's outflowing genius; to listen to the blend of thrilling harmonies, the outburst of the glowing soul; to drink in words, like draughts of nectar from human lips impassioned by the life within.

But now I know that I was wrong. My rapture and their inspiration are both disorder of my sense-re-actions, most likely caused by foul disease in me or generations long before.

But I am done. Let Spencer and his followers beware, lest in their zeal to explain the unexplainable, they light the blaze that, seizing on the dry combustible of selfishness with which the sensual heart is filled, may burn to ash the growing grain of love of justice, kindliness, and purity about to flower among the nations of the earth to-day. It is often said that to Helvetius and his philosophy of sensual delight, were due the gross corruption of society and the social upheavals that, since his day, have cursed his fatherland. But his theory was innocent and noble compared with the extreme materialism of our dominant psychology, and in a thousand ways, the latter is more dangerous than his.

F. H. GILE.

BOSTON, MASS.

CRITICISMS AND DISCUSSIONS.

LITERARY CORRESPONDENCE.[1]

FRANCE.

I am in receipt of a small volume from the pen of Mme. C. Coignet on the evolution of the French Protestantism of the 19th century[2] and which deserves to be called to the attention of the readers of *The Monist.*

Mme. Coignet briefly expounds the history of Protestantism in France and concludes by expressing her desire for a conciliation, a union between "Christian souls." From the "nationalistic" point of view I would like to make a few reservations on the political attitude of Protestants in the history of our country and on the validity and motives of the Act of Separation of Church and State.

It seems to me that Mme. Coignet does not appreciate the position of the Catholics previous to this law. As opportune as the fact of the separation itself appears to be, we cannot approve entirely of the spirit in which it was made nor the conditions under which it has been applied. It is not at all hard for Protestants to accommodate themselves to it, for it was not directed against them but entirely against the Catholic Church, and the fine speeches of our ministers can deceive no one on this point. I do not at all deny that faults have been committed on the other side; I know indeed that ecclesiastics are not wanting who are deeply distressed by the uncompromising attitude of the Holy See. Unfortunately it is no less undeniable that the Catholics have not been encouraged to rely upon the good faith of their opponents. That they were justified in suspecting them is sufficiently proved by the fact that those in control use acts of reprisal against the believers, and these acts are

[1] Translated from the French by Lydia Gillingham Robinson.

[2] *L'évolution du protestantisme français au XIXe siècle.* Paris: F. Alcan, 1908.

of such a nature that no government should ever descend to their use.

But I shall leave these considerations which are of no great interest to your readers, and I shall come at once to the vital part of the little book which has been the occasion of these remarks.

With regard to the great Christian movement which arose toward the end of the 18th century simultaneously in England, Scandinavia and Holland against religious indifference and formalism, Mme. Coignet pertinently remarks that even though the revival might free the individual religious life from the ecclesiastical yoke, it would nevertheless in the guise of doctrine forge anew the chain which it had broken in the guise of the Church. It would, she says, renew it even more closely, for doctrine is abstract and unchangeable, while the Catholic Church humanized by its representatives always has the power to modify itself.

As a result of the revival in France we can see the vague disagreements of former days taking on a new aspect, the Free Church arrayed at the side of the State Church, and the doctrinal party merging into the ecclesiastical division. Formerly there were three parties in the ranks of Protestantism; traditional orthodoxy separated from the liberals by doctrine, and from the disciples of the revival by the Church idea; the liberals separated from each other by doctrine, but allied to the orthodox by the Church idea; and finally, the disciples of reform united to the orthodox by doctrine, but separated from the two parties of the official Church by the same ecclesiastical idea.

I pass over in silence how the reformed orthodoxy was divided at that time (in 1848 and 1849), and how the Protestants, in order to excommunicate each other, again revived within their midst the Catholic absolutism from which they had suffered so much. I shall not now recall the conflicts engaged in, nor the attempts at union during the course of the last fifty years. It is sufficient to mention here the assembly of October 4, 1906, and the synod of Tuesday, April 9, 1907, which will count as noteworthy events in the history of French Protestantism. In the October meeting they had to decide on the attitude they were to take with regard to the Separation Act which had just been passed, and it seemed well that the different sections of reform should unite at this time on practical ground for the defence of common interests without entering upon it seriously or even intentionally neglecting the weighty problems of institutions and doctrine.

The declaration of October 4 would pass over the dangerous question of dogmas and establish unity "on the unique religious value of the Bible, the document of the progressive revelations of God, and on the personality of Christ to which the Bible bears witness." It accepts and proclaims that "the progressive character of divine revelation leaves an open field to the discoveries of exegesis brought to light by the history of comparative religion." Is not this, many people think, a very strange subterfuge? And is not the attitude of all philosophical minds equally delicate and difficult whether in liberal or orthodox Protestantism or in the ranks of Catholicism?

Indeed, union can never be established among Christian souls except on moral grounds, on the beneficence of the Christian spirit. Such without doubt is the conclusion of Mme. Coignet, to whose generous thought I wish to pay homage.

The churches which admit private judgment differ from the churches of authority in that they substitute individual religious experience for all the tangible forms of faith, institutions, and hierarchy. The gulf between Catholics and reformed denominations is not to be found in the nature of faith, but in the means by which it is transmitted. "I once heard," writes Mme. Coignet, "two Catholic priests of undeniable orthodoxy at the conclusion of a religious interview say to a Protestant: 'You are not in the body of the Church, but you are in its *soul*, and we will meet again in the other world.' Why then may we not come together in this life, respecting the diversity of our religious needs in the diversity of our symbols?"

This is the right note, but will it be heard? I wish so sincerely but do not believe it. In France the Catholics are universally distrustful of Protestants, and the Protestants do not understand that the fall of the Catholic edifice far from helping them will crush them under its ruins. It is generally the case that parties, like vanquished nations, perish not from attacks made upon them but from errors which they themselves commit.

LUCIEN ARRÉAT.

PARIS, France.

PHILOSOPHIC TOLERANCE.

A WINTER REVERY.

To-day as I sit before the warm grate fire with the snow-flakes falling outside, I feel in a peculiarly dreamy and charitable mood

towards all mankind, especially philosophers. Perhaps I have what Dooley calls the Carnegie feeling. At any rate there jar upon me more than usually the petty nagging and jostling and rushing to the patent office in the philosophic camp, as though one small head could carry all of truth or as though one expression of truth, however comprehensive, could be more than a passing phase of experience as a whole. Considering the variety of human nature as a result of evolution, why should it not require an indefinite number of systems to express human nature in the various stages of its development and in its various moods? And why are they not all true in so far as they are really genuine and really express human nature then and there? Philosophers, above all people, need open-mindedness and a sense of humor. Dogmatism has erected the stakes and the gibbets for those who have ventured on any new path, while philosophy must always breathe the air of freedom, and has always proved wiser in its hero-worship than in its persecution.

This brings to my mind an occasion in one of the temples of Boston, made more venerable in its associations since then. It was a discussion of educational ideals at a meeting of a brilliant group of educators. It was a Babel of many tongues, one saying: It is this way; another: It is this; one saying: Come to us, we have the latest; another: Come to us, we have the most venerable; another one: Come to us, we have the best equipped bazaar of learning. I remember President Eliot, the aristocratic democrat, the Plato of modern education, rising at the close of the discussion and in his dignified simplicity, gleaning in unadorned eloquence the wisdom of the day. I do not remember his exact words, but the import of them was something like this: "Education is at present in its experimental stage; and in the meantime it is best that each experiment should be carried out with the greatest possible consistency under the best conditions. Harvard has stood for a system of free election in its college course. It is well that a system of required work, under the best conditions, should be tried somewhere, at Princeton perhaps. Thus future generations shall be wiser for our experiments." It struck us all as so eminently sane.

Why is this not true, to an even greater extent, of philosophy, the science of the meaning of it all? Why should we not welcome and encourage different experiments? Is not philosophy, and must it not always be, in the experimental stage? One of the few fragments which have survived from the brilliant author of the *homo mensura* tenet is: "In respect to the gods, I am unable to know

either that they are or that they are not, for there are many obstacles to such knowledge, above all the obscurity of the matter and the life of man in that it is so short." Why should not this brevity of life and the complex and changing character of our world teach us modesty in the ultimate matters, where our little lifetimes and limited point of view must be supplemented by other lifetimes and other points of view, and where the checkered mosaic of truth never can be completed? Truth is at best experimental and nothing can be more fatal than stopping the experiment. The most that will be said of any of us in the ages to come is: Yes, he saw a phase of the problem; or he proved suggestive in the infancy of the science.

I for one, though I have elsewhere urged a *Weltanschauung* of absolute time and realistic pluralism, want to see the experiment of absolute idealism carried out with the best psychological and methodological advantages, and I confess, rabbid realist that I am, that in some moods, in which my passion for permanence and unity asserts itself, I take comfort in absolute idealism, or at least like to play with it. There is a certain intellectual coziness about absolute idealism that I sometimes long for. I want to close the accounts and find how things stand, or at least feel sure that somebody knows and that no evil can befall my ideals. But again, in other, and with me more prevailing moods this esthetic craving gives way to the respect for facts as they seem, to the longing for action and risk; and I sometimes revel, in imagination at least, in the daring and courage of helping to make an unknown future, in which my plans and I myself may prove unfit. A fair field, I say, and no favors, not even for my own pet theories. There are other moods too; and only God knows which is the truest in the end. Ideals may prove truer than facts.

We are told of the Chinese that he has several religions, a different religion for different functions of his life. As a public official and statesman he is a Confucian, this being a religion of ideals for public life. Again, Buddhism supplies the need for ritual and furnishes a larger religious setting, while Taoism, with its forms of magic, satisfies the more primitive folk-lore side of Chinese nature. Beside these there are various local cults. The state recognizes the place these various religions have in Chinese life by supporting them. This condition of things causes no end of trouble to the Western census taker and is very difficult for us sectarian Occidentals to understand. But why should we insist so persistently on fitting human nature into one arbitrary mold for the sake of con-

ventional consistency? Why should we not have recourse to different forms of religion and different systems of philosophy, different universes of appreciation, according to the varying moods and needs of the soul? Why should not institutions, which after all are our creations, be made to serve us, instead of our being enslaved by them?

Here I see the poetic sanity of Plato, which has troubled his stupid and stereotyped commentators so much. The secret of the difficulty of unifying Plato, over which so many have stumbled, is that Plato's philosophy varies with his poetic moods. He, as no other philosopher, coins his own soul; and therefore he has continued to speak to the soul of man as no other philosopher. Each dialogue is a *Weltanschauung* by itself. Most moods seem to fit the overshadowing, large-hearted and sane personality of Socrates, but in other, more abstract moods, the cold personality of Parmenides or Zeno seems more fitting. We have not Plato, but a mosaic of the rich life of Plato. Why should not every sincere man express his life in a philosophy that seems reasonable to him at the time, fits experience now? It is easy enough for the man who deals in mere verbiage to manipulate continually the same identical counters, but not so the man who expresses himself. Thus not only man, but the different moments of man become the measure of all things; and the Sophists, had they been shrewd, might have pointed to the plastic nature of Plato as the best illustration of their theory. Agreement and sameness are practical necessities for the sake of common action, but outside the elementary qualifications for social life are the bane of progress.

In art and poetry conventional limitations have been less effective and made it less difficult for men to be sincere with themselves. We do not demand rigid consistency here. We are disappointed at mere repetition. We look for a different mood of the soul in every new work of the artist. Here human nature has been able to find a more varied and genuine expression for its complex and varying tendencies, and we who enjoy the art find here a varied supplement for our varying inner attitudes. Here it is not a question of either or; there is no need here of finding a common denominator of different types, though silly would-be art lovers will insist on nauseating one with such questions as: What is your favorite painting? your favorite poem? Poor one-horse souls. In the realm of poetry and art we have a right to have our whole nature ministered unto, to live in an infinite number of universes. In one mood we want

lyric sweetness, dreamy romance, Shelley and Keats; in other moods we crave for the searching of tragedy, for something that will appeal to the deeper self within us, and so we ask for the Antigone and Hamlet and Othello. Again we want something that appeals to the heroic, that satisfies the boy within us—and he is always there even in the oldest of us—so we take up Homer. What is the use of taking a vote on the world's greatest poem? The greatest for me is that which expresses my soul most perfectly at the time. Why should I not enthrone each one to an exclusive place in my soul according to my needs, as the ancient Hindu enthroned Indra and Agni and Varuna in turn? There is no poetic Absolute unless it be the freedom of enjoying the varying expressions according to the varying moods.

What is true in poetry is equally true of art in the narrower sense. Why should my admiration for the Sistine Madonna prevent me from enjoying other Madonnas of Raphael, different moods of his soul? And why should my love for Raphael prevent me from loving Millet and Corot? Why should I try to find a common denominator for a Madonna and a Sunset? My soul needs them both; and my love for one does not fill the place of the other, any more than my love for Beethoven's symphonies fills the place of Schubert's songs and Bizet's Carmen. To be sectarian here is to have no music in one's soul and to be fit for all the villainous things of which Shakespeare speaks.

And why should a man's soul be crowded into one system of philosophy? The ultimate realities with which metaphysics deals are no less plastic in the hands of the potter than the realities of art. In either case the soul is endeavoring to create an objective counterpart to its tendencies or needs, to mirror itself, become conscious of itself and so to create anew its meaning through the expression of itself. Philosophy like poetry and art, when it is genuine, is only the expression of a mood of the soul, and it is not always for the artist to tell what mood is most significant. Let each one, then, in the moment when he feels the impulse to create, "from his separate star draw the thing as he sees it," not only once but again and again, as he feels the impulse to express himself. Let the soul create its belief-worlds as its own needs demand, wrapping its belief-mantle around itself to make itself cozy in the world, whether to lie down to pleasant dreams or to face a sea of trouble. In the realm of truth, as well as art, man must be the measure, however finite and passing the measure may be. All sincere expression,

therefore, is worth while. History will see to it that the fittest survives. At least he who has expressed himself genuinely, has become repaid by the insight gained in his own expressive act. If human nature in his case is rich and deep, as well as sincere, the expression becomes significant not only for him, but for others as well, a creation of new social values. The expression of human nature, to what extent it is a measure of the universe or not, is always a measure of the individual soul that expresses itself. The reason that philosophy has exercised so small an influence upon the world compared to poetry, art and religion is that it has often been a matter of verbiage, with no real soul back of it. Philosophic meaning, then, like artistic and poetic, is a mosaic of points of view, of belief-worlds, rather than cut out of whole cloth or according to one pattern. Whether we will so or no, our moods and our lives are phases merely of the whole process of reality and our belief-worlds are phases of the total meaning. At best the objective counterpart of our inner attitudes is a very fragmentary expression of what we feel and mean. Hence it is right that philosophy should have its Plato as poetry has its Shakespeare, and philosophy needs its Walt Whitman too, to reduce it to what is elemental and make it sure of its sincerity. "Make thyself new mansions, oh my soul," must be the motto of philosophy. Let the architecture be Greek or Gothic or both, as the soul may require. The history of philosophy is a picture gallery in which we can study not only the history of thought, but the history of ourselves and through sympathy with the past become conscious of our own meaning in our various moods.

To-day, therefore, I feel that I want to be Chinese in my homage to philosophy as I already am in poetry and art. I like to visit sometimes in the company of my friend Royce, a beautiful Greek temple built according to Plato's Idea of the Good. It is wonderfully complete and satisfying, carried out after the plan of one master artist according to perfect mathematical models, frescoed in an infinitely varied pattern, in which the past, present and future are set in wonderful mosaic through the immortal artist's cunning. And withal the soul is filled with such sweet harmony as to forget for the time being its limitations and its longings. You can only gaze in rapture and wonder at the beauty of it all. So impressed was I that I turned to my friend and asked: What can I do? He replied with a smile at my impatience: Only enjoy the eternal beauty of that which is. And it was wonderful for a time to dream there,

while I could keep quiet and until my old restlessness returned. But I fancy I shall sometime steal in again for another quiet hour, to see Hegel gazing at his chart of logical categories, Augustine in mystic devotion and the transfigured countenance of Plato.

But sometimes I like to worship in another temple, very unlike the one just mentioned, bare and simple in the extreme. It is the temple of Democritus and Priestley and other stern and heroic souls. A temple did I say? Yes, for its devotees were filled with a tremendous reverence and enthusiasm. Yet no ornaments were there, nor roof nor walls. Only a pile of rough-hewn rocks in the wilds of the desert, exposed to the storms and snow and sleet in a climate of perpetual winter. For moments the sunshine would break through the grey clouds and make the landscape sparkle into diamonds and crystals of icy grandeur. But those that worshiped there counted it as naught. They watched the wreaths of sand as they rose in many a whirl, or the fall of the snowflakes, and made records of it all. On the altar were two idols, cut out of granite,—Simplicity and Necessity, grim to look at. To them they offered, to my horror, human sacrifices, their own children. But so the idols craved; and many fond hopes, many warm desires, many tender sentiments went up in smoke on the rock-bound altar. As I stayed I became impressed with the absolute democracy of the religion—the democracy of absolute poverty and absolute law—and their willingness to sacrifice all to what seemed to me mere idols.

So impressed was I with the simplicity and sternness and cold awfulness of it that my inner self seemed to shrink within me to a mere ghost of its former puffed-up state. I felt so impressed with the uncompromising, relentlessly democratic character of the forces of the universe and my own insignificance as a finite individual, that when their priests told me that to please their gods I must sacrifice all that I loved, I threw into the fire many of my conceits, many subjective broodings, and many a petty desire—but not all that I loved, and so I could not become a member of the fraternity. But sometime, I dare say, I shall go out again into the wilds, where I can feel the tonic of the north wind and admire again the bleak solemnity of the scene.

But I could not stay there always. I need to get back to the society of Kant and Fichte and Browning and the rest who have felt that circumstance is to some extent plastic in the service of ideals and that we shall not utterly perish, at least not without having our say. The temple where I spend most of my time is an unfinished

Gothic sort of structure, where many artists are at work, each in his own way. I was introduced to the group by a friend of mine, the brilliant and human William James, who spent a lifetime trying to provide a framework and who is now at work on some plans for the interior. It is a place where everybody has something to do. Each one is allowed to choose his own task, make his own plan and fix his own salary. There is no supervision as yet, in fact the plan is that there shall be no supervision of the work as a whole. This is looked at askance by outsiders and mutiny is prophesied. What can be the worth of the work thus pursued? And how can a man be allowed to draw on the universe according to his own estimate? A system of grading has been suggested to ascertain the fitness of plan and work. But so far no available tribunal has been found except the succession of workers themselves and what appeals to them. Each artist is thus his own judge of fitness and when he is superseded there seems to be no guarantee that his work will be carried on. But as the workers are conscious of each others' plans, and as new artists serve apprenticeships under old masters, it is expected that there will be a degree of continuity and unity.

But after all, the center of interest in this religion is not the temple but the artists. The temple may never be finished, as each artist and each generation of artists modify the plans to suit their own ideals. But the artists get practice and the temple is first of all a school for artists. And each artist is paid at least through the joy of the working and the appreciation he feels for such momentary beauty as each can produce.

Here at least the artist has the sense of doing something, for in the other temples there is nothing to do but contemplate that which is, whether beauty or desert. Here worship is work and work is worship. Perhaps somehow, somewhere and sometime his work may mean more than he knows. Perhaps an unseen Artist may be piecing together from moment to moment the scattered fragments of our insight. If the artist gets disheartened, and if his work and fellow workers do not offer sufficient encouragement, with the strenuous Kant working away at the fresco of his dark corner, and young Fichte with untamed enthusiasm trying to boss the job, and the lovable James preaching his favorite principle of pragmatism, and other heroic souls, "each in his own tongue"—if all of these sometimes fail to please and work becomes irksome, let him go into the temple of beauty, in the fairy land of summer, and rest awhile. And if he gets too absorbed in his own plans to be tolerant

of other workers, I should advise him to go out to that lonely rock-bound altar in the wilds, and there learn to sacrifice his subjective conceits and to respect law and order.

JOHN E. BOODIN.

UNIVERSITY OF KANSAS.

EDITORIAL COMMENT.

Pragmatism is the latest philosophical movement which is at present sweeping over the country, and the foregoing article by Professor Boodin may be taken as a typical instance of the philosophic temperament that is at present in the ascendancy. The founder of Pragmatism is Mr. Charles S. Peirce, and its standard bearer, Prof. William James of Harvard. We must confess that we do not share the enthusiasm of the pragmatism movement, and do not join its ranks. We believe that it has its weak points, and it is our intention to publish in the coming number of *The Monist* a critical discussion of pragmatism as a system of philosophy.

MR. SPENCER'S HEDONISM AND KANT'S ETHICS OF DUTY.

One of our contributors, an author and thinker, a man of thought and earnestness though not a specialist in philosophy, writes in a private letter concerning Kant and Spencer as follows:

"I have lately given some thought (though not very exhaustive study) to the contrasting methods of Spencer and his data of ethics, and Kant as unsympathetically presented by Porter. Spencer seems to me to occupy firm ground in his hedonistic position, and Kant to be rather weak in that particular, also in his disregard of the need for some sort of emotional dynamics as an impulse along the track laid by the understanding."

This criticism, it seems to me, represents the general impression which at first sight a comparison of Spencer's theory of ethics with that of Kant will make on readers who approach the subject for the first time. Spencer naturally appeals to the liberal broad-minded public who wish to know the facts of the origin and nature of ethics even though they would exhibit the untenableness of religious doctrines. Kant's treatise appeals to philosophers by profession who are familiar with other attempts and know exactly the problem which Kant intended to solve. Moreover, Spencer is writ-

ten in a modern style in comparison to which Kant appears stilted and metaphysical. Nevertheless the truth remains that Spencer's system of ethics is a flat failure while Kant is sound in all essentials.

In order to be just to Spencer we must understand that he was from the beginning and remained to the very end of his philosophical career a dilettante, a man who displays a great love of the subject which he takes up, but lacks a thorough preparation. Though science and philosophy are nothing but common sense, it would be a mistake to think that a scientist or a philosopher can start his work without taking note of the results accomplished by his predecessors. Mr. Spencer is hampered by his lack of acquaintance with the thoughts of others, having been, in addition, limited in his reading to works written in his mother tongue. Of foreign philosophers he acquired only an imperfect knowledge from poorly made résumés and bad translations. He started his philosophical as well as his ethical theory on the basis of insufficient information as to the prior efforts made in the same line, and so we must not be astonished that he adopts mistaken views which foreign thinkers had discussed and found wanting.

Kant, as he himself states, had very carefully considered the hedonistic solution of ethics, yet he discarded it without even deeming it necessary to enter into an explicit refutation. Perhaps it would have been better if he had done so, but at his time and in his country hedonism could practically be considered obsolete, and so did not need much attention.

Kant did not enter into a detailed discussion of human life or social institutions and their moral significance, but treated the problem of ethics in a general and purely formal way. In doing so he set forth a principle which may be regarded as a philosophical formulation and indeed a justification of the golden rule. He declared the essence of morality to be that we should so act that the maxim of our individual conduct can become the general rule.

In order to explain the situation we must first understand why the average public is naturally inclined to accept hedonism without further investigation as the most plausible theory.

Every one who is not under pressure of some kind, so as to be compelled to act against his inclination, will necessarily follow that phase of conduct which he has decided on. To express it in a tautology, he will do what he wants to do, or in other words, he acts as he pleases. One's "pleasure" and one's "will" are terms that are all but identical in most languages, and thus the principle

that the decisions of our will are simply an expression of our pleasure is deemed a matter of course which would imply that the tendency to procure pleasure and to avoid pain is the natural frame of mind. It seems absurd to think that a man can voluntarily will anything that could give him displeasure.

This conception is, generally speaking, true; but the identification of will and pleasure is not correct, for it happens frequently that there is a great discrepancy between the two. The mind of man, or to speak broadly, of any sentient creature that acts, consists of impulses or motor ideas, and every motor idea has the tendency to act upon the motor nerves. Will is nothing more nor less than the tension between a stimulated motor idea and its actualization in a deed. If a fighting cock espies an antagonist, his fighting propensity will be aroused and he will go for the enemy without any consideration of pleasure or pain, and the same is true of other impulses in man or beast.

A healthy human mind is a very complicated piece of machinery made up of motor impulses that are constantly stimulated but kept under control by being organized at a central station, a kind of headquarters acting as a check, and allowing nothing to pass into action except after a consideration of all the objections of conflicting impulses. This process is called deliberation, and it is natural that in the average man the decision among a number of alternatives will result in a choice of that motor idea which promises pleasure and would avoid pain. But this average type is by no means a universal rule applicable to all cases. If we ask the question whether every man will choose among all the possible courses of action necessarily the one which promises most pleasure, we must answer that there are innumerable cases in which people of an impulsive nature rush thoughtlessly to action frequently with an utter disregard of their own welfare. But in addition there are men who deliberately set aside their pleasure and choose a course of conduct in which they neither shrink from pain nor attempt to procure happiness, allowing themselves to be governed by maxims that are foreign to the large masses of the vulgar and commonplace people. Every man follows the most powerful motor idea which need not be a love of pleasure nor a fear of pain.

There are many thoughtful men who will now and then with deliberation come to the conclusion that the better course does not always result in happiness, and may involve misery and pain. How many people have suffered martyrdom for the sake of their con-

victions, for their religious faith, for truth, and for their ideals, sometimes for noble purposes, but as often also for Utopian vagaries.

It has been claimed that martyrs think of their future happiness in heaven, in comparison with which the suffering of the present life seems trivial, but a closer investigation will show that these calculations are mere assumptions, and that martyrdom is suffered even by those who do not hope for recompense in the beyond. As a glaring example we mention the fate of Giordano Bruno who did not believe in heaven and yet allowed himself to be burned at the stake simply for the sake of remaining faithful to his convictions, though he might have escaped his tragic fate by a few words of recantation. He mounted the fagots firmly and without hesitation prefering a painful death to a surrender of his philosophical principles. In his case, as well as in all others, he acted as he willed, but in his special case his will was not bent on pleasure but on asserting his convictions which were dearer to him than any consideration of pleasure or pain.

It is a question of fact in ethics whether or not man is guided by a desire for pleasure alone, or whether other motives, too, come into play. Hedonists assume as a matter of fact that every man seeks the greatest happiness and avoids pain as much as possible, and we have to answer as a statement of fact that they are mistaken. Further, it is a question of principle, whether or not we should recommend our children to seek pleasure and to shun pain; and it seems to me very unwise to do so, for it would take the backbone out of man's character, if states of feeling became the sole guide of life, and conviction would count for nothing. In either case, whether we deal with the actual facts of conduct or with principles of education, hedonism breaks down when giving so much prominence to a consideration of pleasure and pain.

The next question in order is whether among the motor ideas of the mind there is such a thing as the intention of doing one's duty irrespective of pleasure or pain; and this is not a question of principle but again of fact, and I would answer this also against the commonly established theory of hedonistic ethics in saying that the idea of duty irrelevant of ulterior expectations of either procuring pleasure or avoiding pain is an undeniable factor in the life of man, and in the phenomena of any community, primitive as well as highly civilized. The notion of a common welfare originated naturally in the shape of what is commonly called society, and the

injunctions of parents, educators, teachers, priests, etc., impress upon the mind of the growing child notions of what ought to be done, irrespective of personal considerations. This "ought" is not a mere theory, but a most powerful factor in the development of mankind, and this "ought" upon the whole aims upon the common welfare of the tribe, the commonwealth, the state, the church, the nation, or any social group of which the individual is a member.

The "ought," or the effort to do one's duty, is a motor idea expressive of a common will and establishes the interconnection of individuals who belong to some superpersonal unit that is being formed in the development of mankind. These superpersonal units follow a law of development similar to that of bodily organisms in animal and plant worlds, their organs being vested in the individuals of the community, consisting of the relations among their members and of the ideals with which they are inspired. We may call them institutions; yet, though they are purely formal, not bodily beings, but mere relations among individuals, they are nevertheless real and highly important.

The motives of the tribal or communal "ought" are similar to the corresponding motives of the individual, and so it has been claimed by hedonists that states, nations, churches, and other bodies also follow a tendency to procure pleasure and to avoid pain, which tendency, in the opinion of individualists, can only be as Mr. Spencer actually expresses it, "the greatest happiness of the greatest number of individuals."

However, if we resort here again to a question of fact, we will find that communal motives are not always bent on the greatest possible happiness of the greatest number of individuals in a community, nor even always on the survival of the tribe, the nation, or whatever it may be, but on the preservation of the communal will, which is the ideal of the community or some purpose characteristic of it. The historian has frequently met with events in the development of races in which a tribe or a city or a state prefers extinction to a survival in an unwelcome form. It is not always the happiness of the greatest number, not always the shirking of pain, trials, difficulties, etc., not always, even, the survival of a tribe or state in the struggle for existence that is aimed at, but we find frequent instances of a persistence of the type of a communal will without any regard to happiness or even survival. Thus the citizens of Saguntum did not surrender to the Romans, and refused all offers of peace committing a wholesale suicide rather than to submit to their hated

enemies, or alter the constitution of their communal life. They preferred non-existence under the most trying and terrible circumstances, allowing themselves to burn to death in the flames of their last stronghold to which they applied the torch themselves before the Romans could enter.

Similar incidents happened in different countries, and some of them are still remembered of some Indian tribes of North America, where the communal will was so strongly built upon the preservation of their own way of being, that they acted without any consideration of their own happiness or avoiding pain or disasters.

If any one should doubt that many actions are performed without regard to pleasure or pain, he should think of religious motives which appeal to men as a duty commanded by the supreme power that regulates the destiny of the world. If King Manasseh of Judah had his children pass through the fire of Moloch, or if the King of Moab offered his oldest son and royal heir as a holocaust on the walls of his city, or if Hiel laid the foundation of Jericho in Abiram his first-born, and set up the gates thereof in his youngest son Segub, it was certainly not done for the sake of procuring pleasure or avoiding pain. It was done simply from the sense of duty, because these men were under the impression that their god demanded the sacrifice. Jephthah expected no increase of happiness nor a diminution of pain by the sacrifice of his only daughter, although he may have feared punishment if he did not comply with the divine will. But the story relates that he simply obeyed the behest of the deity because he deemed it his duty, and this motor idea, not checked by any doubt, was strong enough in him to make him act without any consideration of the pleasure and pain of himself or his family, or his tribe.

The principle of hedonism that a consideration of pleasure and pain rules all decisions of the human soul, though at first sight quite plausible, is very superficial, and it is astonishing that a man who devoted so much time to the subject as Mr. Spencer, did not see the fallacy of it.

The question of hedonism is frequently confused with the proposition that man has a natural right to a pursuit of happiness. But a right to the pursuit of happiness has nothing to do with the problem of duty. Man has a right to smoke in the smoking-car, but for that reason we can not say that smoking is a duty. The pursuit of happiness was deemed wrong according to a mediæval conception of the world, which looked upon nature as evil and upon pleasure

as sin. In contrast to the ethics of self-mortification which proposes to suppress the most natural wants of the human heart, both physical and emotional, hedonism rehabilitates the justice of the pursuit of happiness and in this point hedonism is right. But we must not forget that the pursuit of happiness is not a moral obligation nor a duty, but simply a right. Every man has a right to pursue his happiness in his own way—so long as he does not come in conflict with the legitimate interests of others, or in other words, so long as he does not collide with moral obligations. This limitation, however, is overlooked by the hedonist, and he makes of a right a duty. Unchecked pursuit of happiness according to common experience would very soon produce innumerable conflicts, and the science of ethics has been invented to regulate the interrelation of individuals in a community, and the aim of ethics may lead to, but can not be formulated as "the greatest happiness of the greatest number."

Ethics is a question of quality, not of quantity. It is not the greatest number that should decide what should be moral, and what immoral, but the morally best should be taken as authority; and in the history of the world the aim of communal life is not to produce as much pleasure as possible, but to produce higher and better men, and keep the communal life as much as possible pure and undefiled. What mankind needs most is physical, mental and moral health, conservative progress, and an increase in comprehension as well as power, for the sake of leading better, worthier and more intensive lives.

We will not deny that upon the whole this may produce an increase of happiness, but if it does, it is incidental and should not be taken as the criterion; still less as our guide. It is not the standard of measurement but only an accidental result.

Hedonism is practically a denial of the existence of morality. If man always acted in such a way as to follow the bent of his pleasure, and if no other motive could take hold of his soul; if he were incapable of living up to his convictions as soon as they came in conflict with the happiness of himself or of his own, and furthermore, if the idea of duty should have to be superseded by a pursuit of happiness; we should freely state that ethics did not exist, and that there would be no need of its existence, but that man would remain at the mercy of his passions. However, we do not deem the problem of the justification of hedonism an open question, but an unequivocal fallacy. It is a flagrant contradiction of facts and has originated only through the wrong impression that people saw their

right to the pursuit of happiness endangered by the ascetic's bigoted conception of morality.

We must bear in mind that there are two kinds of hedonism,—the hedonism of Bentham, which alone is consistent, and the hedonism of Mr. Spencer, which under the pressure of circumstances makes considerable concessions to its opponents. Bentham is an individualist. According to his theory man follows the bent of his own individual pleasure, and Bentham deems it right that man should do so. Mr. Spencer substitutes for the happiness of the individual, the greatest happiness of the greatest number, and thus introduces a new factor which recognizes the rights of others, and so radically subverts Bentham's individualistic principle without, however, succeeding thereby in justifying the principle of hedonism itself. If we grant that pleasure is and should be the end and aim of all our actions, and at the same time grant the principle of individualism, there is no way to demonstrate why any individual should sacrifice his own pleasure for the sake of others whether or not they be in the majority.

The expression "the greatest happiness of the greatest number" is characteristic of an ethical theory which is in touch with a philosophical interpretation of the world that discards the word and idea "quality" and explains all qualitative difference as due to difference of quantity. We have discussed the problem as to the nature of quality in another article, and it will be sufficient in this connection to refer to our arguments as to why the idea of quality can not be abolished without leading to a confusion which would render all issues unintelligible.* We must recognize that quality is a real feature of the world, and in almost all practical questions the essential thing is quality and not quantity. Unless we understand the significance of quality, we shall either end in mysticism or in agnosticism. Mr. Spencer ended in agnosticism which is a declaration of bankruptcy in philosophy.

If there is anything in this world in which quality is essential and quantity indifferent, it is most assuredly the nature of right and wrong, of good and evil, and of truth and falsehood. No majority vote can establish truth, and no amount of bad eggs can be deemed equal in quality to one good one; and no preference as to the happiness of the greatest number can establish the morality of certain actions.

The acknowledgment of the rights of others to happiness is

* See *The Monist*, Vol. XV, pp. 375 ff.

a concession which Mr. Spencer in the name of hedonism makes to the traditional ethics of duty; it exposes the weakness of hedonism, but it is insufficient to remedy its shortcomings, and serves only as a *reductio ad absurdum*.

Though it is true that immorality will bring misery, the hankering after happiness is like a *fata morgana* which allures people into errors and mistakes of all kinds by the various false hopes which it arouses, and ethics comes to our rescue by giving us a better insight into the nature of conditions, and warning us of the dangers to which a blind pursuit of happiness inevitably leads.

Kant's ethics may be called the ethics of pure reason. He takes his stand on the principle that a man of goodwill will adopt a maxim of conduct which can be made a universal rule, and whatever may be said in criticism of this principle of pure reason introduced into the domain of ethics, we have no lesser endorsement than its application to practical life by the greatest republic in the world, the United States of North America. One most important and fundamental principle of our social and political life consists in the rule that all laws should apply generally, that there should be no exceptions which apply to one class of people alone, and this apparently insignificant little rule of our legislation has proved a most important safeguard against innumerable ills and illegitimate irregularities that otherwise would have crept into public life. We owe more to this little maxim than to any other part of the constitution, however important they may be in their own way. While this is generally acknowledged by lawyers, legislators, and social economists, philosophers have not as yet noted that it is a practical application of Kant's ultimate maxim of ethics. Those who criticize Kant may well consider the important endorsement his code of ethics has received in this way in the American constitution.

We abstain from entering into further details, but will mention one more point raised by our correspondent, who says that Kant shows a disregard to the need for some sort of emotional dynamics. This criticism is worth mentioning, because to a casual reader of Kant's ethics this seems to be a grievous fault of the great philosopher, but we must bear in mind in this connection that Kant did not intend to preach morals but to explain morality, and as Schopenhauer said, "To preach morals is easy, but to explain morality is difficult." It is a miscomprehension of Kant's purpose to say that he lacked emotional dynamics, for in his essay on ethics emotional dynamics has no place, but would only be a disturbing element.

Many a fervid negro preacher may possess more oratorial dynamics when addressing his emotional audience, and he may indeed be more impressive than the philosopher of pure reason, but for that reason I would not quite deem his ethical system superior to Kant's. Kant is not a preacher, but a thinker, and when writing his treatise on the subject he did not intend to work upon the emotions of his readers.

I have discussed the subject because it seems to me that our correspondent represents a large class of the thinking public who have not been able as yet to give a detailed study to the problems of ethics and are naturally carried away by arguments that lie on the surface. For similar reasons the principles of hedonistic ethics are favored by a large majority of liberal, broad-minded and even serious men, and though we are far from deeming that the pursuit of happiness is to be condemned, we are convinced that the errors of hedonism exercise a baneful influence upon the growing generation of the present age. EDITOR.

MYSTICISM AND SCIENCE.

To the Editor of The Monist.

I have read with interest your article on Mysticism in the last *Monist* and beg to say that I see very little difference in our points of view. It seems to me, if I may say so, that in common with so many others you have regarded mysticism in its abnormal and negative, rather than its normal and positive aspect. It is partly of course a matter of terms. If one identifies mysticism with mystification and individualism and extravagance—and it certainly has these features—he will find little to value in it. But when one gets at the heart of mysticism it seems to me that he finds something that stands for a true appraisal of moral and spiritual truth as above the world of sensation and science. Here again, I find your use of the term "science" far ampler and more inclusive than the common usage. The term itself of course warrants your usage, but can it be made the recognized meaning? Your concluding words upon page 109, which seem to me most admirable, would make a place for what I am contending for as the heart of mysticism under science, but I question if the majority of scientists would endorse them.

I am indebted to you, as no doubt others will be, for the "Cherubinean Wanderer" extracts, as also for the entire discussion.

BERKELEY, CAL. JOHN WRIGHT BUCKHAM.

QUESTIONS FOR PSYCHICAL RESEARCH.

The American Society for Psychical Research is circulating a request for information with regard to unusual mental experiences of all types. This is issued in the form of a questionaire, and to be of any value whatever it is very important that as large a number of answers as possible be obtained.

In responding to the questions informants are requested to answer "Yes" or "No" to each question according to the circumstances of their experiences and to write out a detailed account of such as are answered affirmatively. In general, it is well to report experiences as soon as possible after their occurrence, but in any case the day and hour of the incidents should be recorded when known, and all possible details regardless of the points that may most interest the narrator. Pertinent documents are valuable, and it is best to avoid theoretical explanations in the relation of facts.

The Society guarantees that neither names nor facts shall be used in any public manner without permission.

LIST OF QUESTIONS.

1. Have you ever experienced any interesting *Illusions*, visual, auditory, tactual, or other type?

2. Have you ever had any *Hallucinations*, visual, auditory, or other type?

3. Have you ever had any experiences which were evidently mere *chance coincidences?*

4. Have you had any remarkable *dreams*, whether coincidental or otherwise?

5. Have you had any remarkable *visions* or *auditory experiences*, not of the nature of apparitions and not of a coincidental character?

6. Do you know of any *visions* or other interesting experiences of *dying persons?*

7. Have you ever had any *apparitions* of living or deceased persons, whether coincidental or otherwise?

8. Have you ever had any experiences in so-called *clairvoyance* or *clair-audience*, representing really or apparently supernormal knowledge of physical objects, places, or events out of all possible range of normal sense perception?

9. Do you know of any remarkable phenomena associated with or apparently due to hypnotic conditions?

10. Have you ever had any *premonitions*, or experiences really or apparently forecasting future events?

11. Have you ever had any experiences in *thought transference* scientifically called *telepathy?*

12. Have you ever had any unusual experiences under the influence of ether or chloroform?

13. Have you ever had any unusual experiences in connection with the use of narcotics or stimulants, whether taken for medical or other purposes?

14. Have you ever had any personal knowledge of instances of subconscious stimulation of other persons or personalities, in other words cases of alternating personalities, or occasional instances of subconscious mental action of an interesting character?

15. Have you ever had any experience with automatic writing or drawing, the Ouija board, and the Planchette?

16. Have you ever had any experiences with mediums or psychics so called?

17. Have you ever had any experiences in connection with "*haunted*" houses?

18. Have you ever heard any *raps* or noises which apparently could not be explained by ordinary causes?

19. Have you ever witnessed the movements of objects without apparent physical contact and under circumstances suggesting unknown or unusual causes?

20. Have you ever observed, or had reason to believe, the existence of real or apparent supernormal experiences among animals of any kind?

21. Have you observed or known any phenomena among the blind or the deaf and dumb that were apparently not explained by ordinary causes?

22. Do you know any persons who have had any of the experiences enumerated in the above questions? If so, can you ascertain name and address and also whether we can be permitted to have communication with the same?

Please to address all reports and records to Dr. James H. Hyslop, 519 West 149th St., New York, N. Y.

AN ESPERANTO GRAMMAR.

To the Editor of The Monist:

Notwithstanding the great amount of publicity which has been given to Esperanto, the international language, I find that at this time not more than one-tenth of the people of the United States have even a vague idea of its purpose and scope, and perhaps not one in a hundred has a reasonably definite conception of it. As a sort of counter-irritant to the irresponsible criticism which is occasionally circulated by the uninformed, I have printed for free distribution a second edition of 100,000 copies of a small primer, *Elements of Esperanto,* setting forth the grammar, word-construction and purpose of the language, and will mail a copy to any person who requests it, sending stamp for postage. While you may not be personally interested, there are thousands of your readers to whom this movement for an international auxiliary language, which now covers every country on earth, will appeal as something more than a fad, and they would appreciate your giving space to this letter.

ARTHUR BAKER.

1239 Michigan Avenue, Chicago.

BOOK REVIEWS AND NOTES.

ATHENIAN LEKYTHOI. With outline drawing in glaze varnish on a white ground. By *Arthur Fairbanks*. New York: Macmillan, 1907. Price $4.00 net.

Arthur Fairbanks, formerly professor at Iowa University, and now director of the Museum of Fine Arts, Boston, Mass., has written a book on the Athenian White Lekythoi, which is published as Volume VI of the Humanistic Series of the University of Michigan Studies. The book is illustrated with a number of specimens which show very well the form of these vases as well as the pictures painted upon them. *Lekythos* means originally a flask, a pitcher, or a bottle, and was so used in Homer, but it was soon applied to a peculiar kind of vase used between 475 and 435 B. C. for funerary purposes in Greece and mainly in Athens.

Professor Fairbanks says: "The typical lekythos shape was attained by the beginning of the fifth century, i. e., before the outline technique became general on this kind of vase, and the changes which appear after this date affect only details. The lekythoi with outline drawing on a white ground are small vases ordinarily from six to twelve inches high, with a high, nearly straight, body on a disk-foot, a slender neck to which is attached the small high handle, and a rather large bell-shaped mouth. The upper two-thirds of the body is covered with a white or whitish slip on which the design is drawn in outline."

Scenes represented on them are either mythological or represent domestic life, or picture visits of relatives to the tomb. Though it is not definitely known it seems to have been for receiving perfume and not to have served any other practical purpose, for some of the necks are not hollowed out and any contents must have been in the bell-shaped mouth of the vessel. Their form is quite elegant and these products of Athenian pottery will accordingly be of interest to both artists and archæologists.

PRÉCIS RAISONNÉ DE MORALE PRATIQUE PAR QUESTIONS ET RÉPONSES. Par *André Lalande*. Paris: Alcan, 1907. Pp. 70. Price 1 fr.

M. Morlet, superintendent of the Michelet Lyceum at Vanves, is in the habit of presenting at the beginning of each year a number of moral rules to his scholars to which he refers during the year in his punishments as well as rewards. He requested M. André Lalande to compile these in a systematic form into a kind of catechism which appeared first in the Bulletin of the Société Française de Philosophie. It is now published in book form after having had the benefit of criticisms and revision. The intention of the author is to present practical lessons in morality as concisely as possible, and he has

used the usual form of a catechism, covering almost all grounds that need special instruction. The introduction defines morality and morals, consciousness and the idea of happiness. The first part treats of the following subjects: Good Will and Courage, Personality, Intellectual Duty, Justice and Tolerance, Community of Interests, Fraternity, and The Moral Life. The second part is especially devoted to duty towards children and is divided into the following chapters: Special Morality, The Family, Discipline and Instruction, Comrades, Initiative, and the Choice of a Profession. There is no doubt that the book will contain many valuable suggestions to educators.

HELVÉTIUS; SA VIE ET SON OEUVRE. D'après ses ouvrages des écrits divers et des documents inédits. Par *Albert Keim*. Paris: Alcan, 1907. Pp. 716. Price 10 fr.

Helvetius, in spite of his shortcomings, was one of the most remarkable figures of the close of the eighteenth century, and he will continue a most influential thinker for all future ages. From whatever standpoint we may consider his significance, whether as a psychologist, moralist, epicurean, poet, economist or one of the encyclopedists, he was in all these various efforts of his literary labors, a man of practical life aiming at a social reformation. With all his fervor he loved the ideas of the new civilization which are now being more and more actualized in the living present, and he deserves a calm and just appreciation of his comprehensive work. This has been undertaken by Dr. Albert Keim, who had at his disposal a number of curious editorial documents, and he has done his work with patience and calm impartiality.

Dr. Keim has analysed bit by bit in the present voluminous work the thoughts of a man whose utilitarian doctrine has exercised an incontestable influence upon statesmen, philosophers and writers of his age down to the present time, and this influence is not at all confined to France but has been felt almost equally in other countries. The present work will undoubtedly remain classical in its way and will be of value to all historians and philosophers.

L'ORIENTAZIONE PSICOLOGICA DELL' ETICA E DELLA FILOSOFIA DEL DIRITTO. Da *Alessandro Bonucci*. Perugia: Bartelli, 1907. Pp. 378. Price, 7 l. 50.

Prof. Alessandro Bonucci in his *L'orientazione psicologica* investigates the relation of ethics, philosophy and jurisprudence to psychology, devoting a large space to moral valuation. Upon the juridical facts as they exist in man's social relation he builds up his civil and penal law.

NOTES DE LA MAIN D'HELVETIUS. Publiées d'après un manuscrit inédit avec une introduction et des commentaires par *Albert Keim*. Paris: Alcan, 1907. Pp. 116.

The work of Helvetius, one of the leading French naturalists of the eighteenth century, are well known to all students of philosophy. They have exercised a powerful influence on the development of modern thought, and with all their shortcomings belong to the most important philosophical books, but it is little known that Helvetius left a kind of diary in manuscript which contains all kinds of notes, essays, inquiries, interesting and profound maxims,

of all ages,
th an intro-
litions under

BOOK REVIEWS

Athenian Lekythoi. With outline dr
ground. By *Arthur Fairbanks.*
$4.00 net.

Arthur Fairbanks, formerly profess
tor of the Museum of Fine Arts, Bost
Athenian White Lekythoi, which is pul
istic Series of the University of Michig
a number of specimens which show ve
as the pictures painted upon them.
pitcher, or a bottle, and was so used
a peculiar kind of vase used between
in Greece and mainly in Athens.

Professor Fairbanks says: "The t
beginning of the fifth century, i. e., b
eral on this kind of vase, and the ch
only details. The lekythoi with outl
vases ordinarily from six to twelve
body on a disk-foot, a slender neck t
and a rather large bell-shaped mou
covered with a white or whitish slij

Scenes represented on them ar
life, or picture visits of relatives
known it seems to have been for
any other practical purpose, for s
any contents must have been in
form is quite elegant and these p
be of interest to both artists and

Précis raisonné de morale pra
Lalande. Paris: Alcan, 1
M. Morlet, superintendent
habit of presenting at the begi
his scholars to which he refers
rewards. He requested M. A
form into a kind of catechis
Société Française de Philoso
having had the benefit of criti
is to present practical lessons

ph McCabe. Lon-
Poems and Transla-
raets, 1907. Pp. xiii,
ragen und eingeleitet
423. Price 5 m. 40.—
entano.' Leipsic: Dun-
The Sanity of Art. By
Pp. 113. Price 75 c.
Tr. by S. T. Byington.
Lectures on Humanism.
Pp. 243. Price 4s. 6d.—
w York: Fenno. Pp. 245.
on Alfred Wenzel. Leipsic:
sophie et philosophes. Par
Pp. 207. Price 2 fr. 50.—La
Par J. de Tonquédec. Paris:
Price 1 fr. 50.—Le Philosophe
a David. London: Luzac, 1907.
dern Culture. By Charles Gray
. 310. Price $1.25 net.—Contrasts
enney, A. M. New York: Long-
Price, $2.50 net.—Primitive Secret
nd Religion. By Hutton Webster,
Pp. xii, 227. Price $2.00 net.—Die
arl Stumpf. Leipsic: J. A. Barth,
der Werte. Von Hugo Münsterberg.
0 m. Boards 11 m.—The Ancient His-
Dynasty. By Friedrich Hirth, Ph. D.
Macmillan), 1908. Pp. xiii, 383. Price
(Swedenborgian). By O. L. Barler.
Light. By H. Fielding Hall, (Author
York: Macmillan, 1908. Pp. 228. Price
ers. Selections compiled by Benjamin
Mifflin & Co., 1908. Pp. 740. Price $2.50
By H. Addington Bruce. New York:
xiii, 246. Price $1.50 net.—Hints Toward a
Stork. Philadelphia: Lutheran Publication
ible. By George Holley Gilbert. New York:
ce, $1.25.—The Formation of the New Testa-
ris. Philadelphia: Griffith & Rowland Press,
—The Discovery of the of the Soul. By Floyd
Fenno & Co., 1908. Pp. 247. Price $1.00.

Magic Squares and Cubes

By W. S. ANDREWS

With chapters by Paul Carus, L. S. Frierson and C. A. Browne, Jr., and Introduction by Paul Carus.

206 pp., cloth binding, gilt top. PRICE $1.50 Net (7s. 6d)

Mr. W. S. Andrews of Schenectady, N. Y., was one of Mr. Edison's trusted assistants in the early 80's of the last century when that great inventor was perfecting his system of electric lighting by incandescent lamps, and he is still taking an active part in the Electrical Engineering field.

During his leisure hours he has given considerable thought to the working out in his own original way the construction of magic squares and cubes of various styles and sizes. The developement of these mathematical curios according to regular rules, and by the aid of geometrical diagrams is a novel feature in his work which has attracted the attention of others interested along the same lines, and such contributions on the subject as they have had to offer he has incorporated in this book, making it a most comprehensive presentation of the subject

The first two chapters consist of a general discussion of the general qualities and characteristics of odd and even magic squares and cubes, and notes on their construction. The third describes the squares of Benjamin Franklin and their characteristics while Dr. Carus adds a further analysis of these squares. The fourth chapter contains "Reflections on Magic Squares" by Dr. Carus in which he brings out the intrinsic harmony and symmetry which exists in the laws governing the construction of these apparently magical groups of numbers. Mr. Frierson's "Mathematical Study of Magic Squares" which forms the fifth chapter, states the laws in algebraic formulas. Mr. Browne contributes a chapter on "Magic Squares and Pythagorean Numbers" in which he shows the importance laid by the ancients on strange and mystical combinations of figures. The book closes with three chapters of generalizations in which Mr. Andrews discusses "Some Curious Magic Squares and Combinations." "Notes on Various Constructive Plans by which Magic Squares May be Classified," and "The Mathematical Value of Magic Squares."

The Open Court Publishing Co.

P. O. Drawer F. 378-388 Wabash Ave., Chicago, Ill.

London: KEGAN PAUL, TRENCH, TRÜBNER & CO., Ltd.

Mr. David P. Abbott, who is widely known as the author of "Behind the Scenes with the Mediums" and also in other ways for his general interest in mediumistic phenomena and the fascinating problem of magic, feels that a star of first magnitude has arisen on the magical horizon and accordingly has written a pamphlet describing in glowing colors

"The Marvelous Creations of Joseffy"

25 pp. 15 illustrations. 15 cents postpaid. (9d.) The Open Court Publishing Co., P. O. Drawer F, 378-388 Wabash Ave., Chicago, Ill. London: Kegan Paul, Trench, Trübner & Co., Ltd.

"The History of A Strange Case"

A study in Occultism, by David P. Abbott, author of "Behind the Scenes with the Mediums."

An elderly woman in a small Ohio town who has a peculiar physical gift has shown great aptitude in mystifying people by means of spiritualistic seances. This case of Mrs. Blake has aroused considerable comment among leaders of the Physical Research Society. Mr. Abbott himself considers it one of the most remarkable instances on record and gives a detailed account of a series of meetings held by Mrs. Blake in the presence of Professor Hyslop, Mr. Abbott, and an unknown friend of the latter. Some of the physical manifestations he is able to account for finally, and although he cannot pretend to solve all details, he clears up enough to convince all but the most credulous that even Mrs. Blake does not furnish proof of spirit-communication.

50 pp. 15 cents postpaid. The Open Court Publishing Co., P. O. Drawer F, 378-388 Wabash Ave., Chicago, Ill. London: Kegan Paul, Trench, Trübner & Co., Ltd.

PRESS NOTICES AND INDIVIDUAL OPINIONS OF

A SCRAPBOOK OF Elementary Mathematics

NOTES, RECREATIONS, ESSAYS

By WILLIAM F. WHITE, Ph. D., State Normal School, New Paltz, New York.

FRONTISPIECE AND 60 DIAGRAMS AND OTHER ILLUSTRATIONS

12 mo. 248 pp , cloth binding, gilt top, price $1.00 net. (5s. net.)

"IN THIS BOOK MATHEMATICS IS PRESENTED IN LITERARY FORM."

The following individual opinions are from letters written to the author and have reference to sections of the book as they appeared as magazine articles. Except where the plural is used, they referred only to the story "Alice in the Wonderland of Mathematics," the only article that had then appeared.

FROM THREE OF AMERICA'S FOREMOST MATHEMATICIANS

Gems "These gems of yours from the Open Court. They delight me."
— *George Bruce Halsted.*

Vital interest "I read them and enjoyed doing so. I heartily congratulate you upon your success . . . I always take time to look into things that come from your pen. I know that I shall find something of vital interest in them."
— *David Eugene Smith.*

Knew where to stop "I congratulate you most heartily. I do not see where it could be improved. You knew where to stop as well as where to begin."—*James M. Taylor.*

FROM OTHERS BEARING WELL-KNOWN NAMES

Charming essays Dr. Ernst Mach, professor in the University of Vienna, recently called the greatest of living scientists, began his letter:
"In einem Ihrer reizenden Aufsätze."

Very ingenious Prof. W. H. Crawshaw, author of *The Making of English Literature:*
"Very ingenious and withal decidedly interesting."

Imagination with technical studies Prof. Albert Perry Brigham, author of *A Text-book of Geology, Geographic Influences in American History, From Trail to Railway, etc.:*
"'Alice in the Wonderland of Mathematics,'—a pretty illustration of the value of joining the imagination with technical studies."

A facile pen R. P. Williams, author of the books on chemistry and a departmental editor of *School Science and Mathematics:*
"You wield a facile pen . . . The Open Court reprints are very interesting and instructive."

More roses and fewer thistles Washington Irving, nephew of "the first American man of letters":
"In the study of mathematics, had I had such a guide as you, I am certain I should have found more roses and been stung by fewer thistles."

First mathematics I ever enjoyed Also one from a former college president, now a real estate dealer:
"The first mathematics I have ever enjoyed, except figuring up interest money. It is splendid."

REVIEWS OF THE BOOK

A keen insight into the beauty of applied mathematics "The book is unique in its presentation of problems and theories and a number of short methods are explained. The book treats of arithmetic, algebra and geometry and the illustrations are for the most part drawn from the scientific, commercial and industrial activities of the day. Properly speaking it is not a text-book but a keen insight into the beauty of applied mathematics as a study."
—The *Colgate Madisonensis*, Colgate University, Feb. 11, 1908.

An amusing and breezy element

"Professor William F. White, Ph. D., of the mathematical department of the State Normal School at New Paltz, N. Y., has published, through the Open Court Publishing Company, a volume entitled *A Scrapbook of Elementary Mathematics*. The 'science of numbers' is usually regarded in the light of a dry and serious pursuit. But Mr. White infuses into it an amusing and breezy element which shows that even so prosaic a subject has its lighter side, and that, too, without sacrificing the mathematical rigor which necessarily pertains thereunto. ($1.)"

—The *Examiner*, N. Y. Department of Literary Notes, March 12, 1908.

A long-felt want

"The book is interesting, valuable and suggestive. It is a book that really fills a long-felt want. It is a book that should be in the library of every high school and on the desk of every teacher of mathematics."

—*The Educator-Journal.*

The following extracts from the table of contents will serve to indicate the nature and scope of the book:

THE OPEN COURT PUBLISHING COMPANY

378-388 Wabash Avenue, Chicago

Date.....

THE OPEN COURT PUBLISHING COMPANY
378-388 Wabash Avenue, Chicago, U. S. A.

Gentlemen:—Please send me a copy of the "SCRAPBOOK OF ELEMENTARY MATHEMATICS," for which I enclose $1.00.

.....

.....

.....

Remittances may be made by Express or Postal Money Order, or by drafts on Chicago or New York. When paying by personal checks add 10 cents for collection charges.

Behind the Scenes with the Mediums

By DAVID P. ABBOTT

328 Pages, Cloth, Gilt Top - - - Price, $1.50 net

TABLE OF CONTENTS

THE OPEN COURT PUBLISHING CO., 378 Wabash Ave., Chicago

Babel and Bible

Three Lectures on the significance of Assyriological Research for Religion; Embodying the Most Important Criticisms and the Author's Replies

BY

DR. FRIEDRICH DELITZSCH

Professor of Assyriology in the University of Berlin.

TRANSLATED FROM THE GERMAN BY

THOMAS J. McCORMACK AND W. H. CARRUTH

PROFUSELY ILLUSTRATED COMPLETE EDITION

PAGES XXIII + 247. PRICE BOUND, $1.00 NET

The illustrations of the American edition are of larger size than those of the German original. They have been supplemented by pertinent additional pictures and by those materials which have done so much to make these lectures interesting, especially the Emperor's Letter, and the most important passages extracted from essays written by Delitzsch's critics.

"A very useful service has been done by the publication of a translation of Dr. Delitzsch's "Babel and Bible"; it brings together in brief and well-considered shape, by a man thoroughly familiar with the subject, the broad general outlines of the results of the explorations of the past half-century. . . . Taken as a whole, this little volume, with its rapid survey, its illustrations, and its grasp of the entire subject gives exactly what many have wanted on Babylonian discoveries."—*The Philadelphia Press.*

"He writes with great calmness and moderation. From the beginning to the end of his lecture he displays a noble attitude of humility which lends an irresistible charm to his exhaustive scholarship. . . . There is no danger that any established conclusion of modern learning will be refused admittance to the halls of Catholic scholarship."—*Catholic World.*

"For one who is anxious to know just what Assyriology has done in elucidating the meaning of the Old Testament and in establishing its chronology, no better reference work could be suggested than this timely little book of Professor Delitzsch's."—*Hartford Seminary Record.*

"The little book is to be heavily recommended as a popular *exposé* of the present status of Semitic research in reference to its bearing upon the Bible."—*New York Times.*

"It is a fascinating story, simply and vividly told,—the story of a philosopher to an emperor, of a teacher to his students."—*Unity.*

"This little book will be read with interest. . . . Succeeds in conveying some clear notions of the high Babylonian civilization that held sway in Western Asia during the third and second millenniums B. C.—surely one of the most wonderful phenomena of history, which has been literally unearthed during the present generation, having been wholly unknown and unsuspected before the excavations of our own day."—*Tablet.*

"The work is pleasant reading and gives a very complete *résumé* of the results of Assyrian research in relation to Biblical studies. . . . It should be of use to students and teachers."—*London Globe.*

"This lecture created a profound sensation when delivered before the German Emperor. It gives in popular language, with illustrations, the best succinct account we know of the results of recent studies in Assyriology."—*Methodist Magazine and Review.*

"Has stirred up much excitement among the people who have hitherto paid little attention to the mass of information which the recently discovered remains of ancient Assyria have contributed to our knowledge of the history and of the ideas of the Bible."—*Biblical World.*

THE OPEN COURT PUBLISHING CO. CHICAGO

Zarathushtra, Philo, the Achaemenids, and Israel

Being a Treatise upon the Antiquity and Influence of the Avesta, for the most part delivered as University Lectures.

By Dr. Lawrence H. Mills, Professor of Zend Philology in the University of Oxford, Translator of the Thirty-first Volume of the Sacred Books of the East, Author of the Five Zarathushtrian Gathas, etc. Part I.—Zarathushtra and the Greeks. Part II.—Zarathushtra, the Achaemenids and Israel. Composed at the request of the Trustees of the Sir J. Jejeebhoy Translation Fund of Bombay. 8vo. Pp. xiii, 208; xiv, 252, two parts in one volume, cloth, gilt top, $4.00 net.

Shortly before the death of Professor James Darmesteter, of Paris, the great authority on the "Zend-Avesta," he surprised the general public by changing his views concerning the antiquity of the Zoroastrian literature, maintaining that the "Gathas" were largely influenced by the writings of Philo, and were written about the beginning of the Christian era. This change of view on his part led the Parsees of India to engage Dr. Mills to write a book upon the great antiquity of the "Avesta." After several years of continuous devotion to the subject, the present volume is put forth as the result, and it amply meets all expectations. The antiquity of the Zoroastrian literature is successfully maintained, and in such a manner that ordinary readers can appreciate the argument.

"The Avesta in no sense depends upon the Jewish Greeks. On the contrary, it was Philo who was in debt to it. He drank in his Iranian lore from the pages of his exilic Bible, or from the Bible-books which were then as yet detached, and which not only recorded Iranian edicts by Persian Kings, but were themselves half made up of Jewish-Persian history. Surely it is singular that so many of us who 'search the scriptures' should be unwilling to see the first facts which stare at us from its lines. The religion of those Persians, which saved our own from an absorption (in the Babylonian), is portrayed in full and brilliant colors in the Books of the Avesta, because the Avesta is only the expansion of the Religion of the sculptured edicts as modified. The very by-words, as we shall later see, are strikingly the same, and these inscriptions are those of the very men who wrote the Bible passages. This religion of the Restorers was beyond all question historically the first consistent form in which our own Eschatology appeared" (pt. i. pp. 206-207).

The conclusions come with great force in support of the genuineness and authenticity of the biblical references to Cyrus in the Old Testament. Students of the literature of the Captivity will find the volume invaluable. The facts now brought to light are such as the literary critics cannot afford to neglect.

The Open Court Publishing Co.

378 Wabash Avenue, Chicago

VOL. XVIII. No. 3. JULY, 1908.

THE MONIST

A QUARTERLY MAGAZINE

Devoted to the Philosophy of Science

Editor: DR. PAUL CARUS. *Associates:* E. C. HEGELER. MARY CARUS.

CONTENTS:

(For particulars see inside title-page.)

CHICAGO

THE OPEN COURT PUBLISHING CO.

Price, 60 cents; Yearly, $2.00

LONDON: Kegan Paul, Trench, Trübner & Co., Ltd.

In England and U. P. U., half a crown; Yearly, 9s 6d.

Class Matter Oct. 19, 1890, at the Post Office at Chicago, Ill., under Act of March 3, 1879.

VOL. XVIII. JULY, 1908. NO. 3.

THE MONIST

PRAGMATISM.

PRAGMATISM is a new philosophical movement, but the word "pragmatic"[1] from which the term is derived has been in existence for more than two thousand years. In ancient Greece it meant "businesslike, practical, or ready for action"; it was applied to lawyers, statesmen and soldiers. In Rome the adjective *practicus* became a noun and denoted an attorney or legal adviser, and a man who gave points to orators; we might translate it by "practitioner of law." An imperial edict was called *pragmatica jussio*, and a decree in state affairs that should be regarded as inviolate, *pragmatica sanctio*. The best known pragmatic sanction of history is the pact which Emperor Charles VI made with the European powers to recognize the succession of his daughter Maria Theresa to the throne of all the possessions of the house of Hapsburg, in the absence of male heirs.

In philosophical language Kant used the word "pragmatic" in the sense of "prudent," meaning thereby a mode of action by which a purpose might be attained.

In the middle of the nineteenth century it was customary in Germany to speak of pragmatic historiography[2] by which term was meant a description of historic events in their causal connection, and under Bismarck's regime

[1] πραγματικός.

[2] *Pragmatische Geschichtschreibung.*

"pragmatic politics" denoted a policy which was bent on success without regard to principle.

THE PRAGMATIST'S CONCEPTION OF TRUTH.

Pragmatism in philosophy is of recent date and what it means is best stated in the words of Professor William James of Harvard, who says on page 46 of his recent work on *Pragmatism*:[3]

"The term is derived from the same Greek word πράγμα, meaning action, from which our words 'practice' and 'practical' come. It was first introduced into philosophy by Mr. Charles Peirce in 1878. In an article entitled 'How to Make Our Ideas Clear,' in the *Popular Science Monthly* for January of that year Mr. Peirce, after pointing out that our beliefs are really rules for action, said that, to develop a thought's meaning, we need only determine what conduct it is fitted to produce: that conduct is for us its sole significance. And the tangible fact at the root of all our thought-distinctions, however subtle, is that there is no one of them so fine as to consist in anything but a possible difference of practice. To attain perfect clearness in our thoughts of an object, then, we need only consider what conceivable effects of a practical kind the object may involve—what sensations we are to expect from it, and what reactions we must prepare. Our conception of these effects, whether immediate or remote, is then for us the whole of our conception of the object, so far as that conception has positive significance at all."

The statement of Mr. Charles S. Peirce, "that our beliefs are really rules for action," is an explanation, not a principle, and the explanation is made so that we may rightly understand the nature of belief. Beliefs are never held at random; they serve a purpose and the purpose of a belief is ultimately to insure a definite line of conduct. It is not probable that any one would take exception to this. Professor James, however, goes beyond the original meaning of the term by changing the statement of fact into a principle, and he applies it to his conception of truth.

[3] New York: Longmans, Green & Co., 1907.

Let us see what he makes of it. We read on page 76 an italicized definition of truth:

"The true is the name of whatever proves itself to be good in the way of belief, and good, too, for definite, assignable reasons."

Professor James seems to outdo Bentham's utilitarianism. He continues:

"If there were no good for life in true ideas, or if the knowledge of them were positively disadvantageous and false ideas the only useful ones, then the current notion that truth is divine and precious, and its pursuit a duty, could never have grown up or become a dogma. In a world like that, our duty would be to shun truth, rather. But in this world, just as certain foods are not only agreeable to our taste, but good for our teeth, our stomach, and our tissues; so certain ideas are not only agreeable to think about, or agreeable as supporting other ideas that we are fond of, but they are also helpful in life's practical struggles."

We grant that *in the long run* truth will always be the best, but for that reason we deem it rash to identify "the true" with "whatever proves itself to be good in the way of belief." Certain foods are agreeable to our taste and good for our teeth, but obnoxious to our health; can we then identify what is wholesome with what is palatable? So there may be certain ideas "good for definite, assignable reasons," but they need not on that account be true.

Professor James's definition of truth is reiterated in various ways. On page 77 we are told:

"'What would be better for us to believe'! This sounds very like a definition of truth. It comes very near to saying 'what we ought to believe': and in that definition none of you would find any oddity.

"Ought we ever not to believe what it is better for us to believe? And can we then keep the notion of what is better for us, and what is true for us, permanently apart? Pragmatism says no, and I fully agree with her."

In the chapter entitled "The Action of Truth" we read on p. 201 another italicized definition of the same kind:

"True ideas are those that we can assimilate, validate, corroborate and verify. False ideas are those that we can not. That is the practical difference it makes to us to have true ideas; that, therefore, is the meaning of truth, for it is all that truth is known-as."

THE USEFUL LIE.

Science rests upon the supposition that a statement once acually proved to be true remains true, while utility is subject to change. Professor James says of truth (p. 204):

"You can say of it then either that 'it is useful because it is true' or that 'it is true because it is useful.' Both these phrases mean exactly the same thing, namely that here is an idea that gets fulfilled and can be verified."

What of a useful lie? It accomplishes its purpose, for it will bring help in a dilemma. The *Cynic's Calendar* thus substitutes the word "lie" in the familiar proverb, saying, "A lie in time saves nine." Perhaps the liar knows that a lie goes only a little way, but it may go far enough to suit his purpose. And what of that villainous maxim to force a belief upon people who are unwilling to accept it? Has not the Inquisition succeeded in keeping Spain under the influence of Rome until to-day? Was not the night of Bartholomew a success? The Huguenots have been swept out of France and are even to-day but a small minority. Was not the Reformation suppressed by foul means in Bohemia, when at the time of the Hussite movement it seemed to be lost to the Church? Must we be reconciled to a pragmatic policy of this kind because it works within certain limits? It certainly paid those who acted upon this pragmatic conception of truth. Would not Professor James himself demur at this? At least I hope he would be sufficiently inconsistent, not to accept the consequences of his definitions.

Even as matters are, judging from his own statements, he goes very far in his practical admissions, and he claims

that for the very plasticity of its view of truth, pragmatism is at a great advantage in the religious field. If one finds it profitable to believe in God, very well, to him the existence of God is a truth. If another finds a scientific satisfaction in the non-existence of God, to him atheism is true.

TRUTH COMPARED TO CASH VALUE.

Professor James speaks of his definitions of truth as "the truth's cash value in experiential terms" (p. 200); and years ago, in 1888, in an article entitled "Cognition, Knowledge and Truth," I used the very same expression:[1] "Abstract thoughts do not on the one hand represent absolute existences, nor on the other are they mere air castles; they are built upon the solid ground of reality. The facts of nature are specie and our abstract thoughts are bills which serve to economize the process of an exchange of thought. We must know the exact value in specie of every bill which is in our possession. And if the values of our abstract ideas are not ultimately founded upon the reality of positive facts, they are like bills or drafts for the payment of which there is no money in the bank."

This looks like an agreement between his views and my own, but there seems to be an important difference, for according to Professor James, ideas are not true or untrue, they become true. He says (p. 201):

> "The truth of an idea is not a stagnant property inherent in it. Truth *happens* to an idea. It *becomes* true, is *made* true by events. Its verity is in fact an event, a process: the process namely of its verifying itself, its veri-fication. Its validity is the process of its valid-ation."

This will be a puzzle to the reader until he understands the statement in the light of another passage. Professor James means that an idea must be assimilated in order to

[1] First published in *The Open Court*, Vol. II, p. 1458, and reprinted in *Fundamental Problems*, p. 17-18.

become true to us. As a psychologist he studies the origin of a conviction and identifies conviction with truth. He says:

"A new opinion counts as 'true' just in proportion as it gratifies the individual's desire to assimilate the novel in his experience to his beliefs in stock. It must both lean on old truth and grasp new fact; and its success (as I said a moment ago) in doing this, is a matter for the individual's appreciation. When old truth grows, then, by new truth's addition, it is for subjective reasons. We are in the process and obey the reasons. That new idea is truest which performs most felicitously its function of satisfying our double urgency. It makes itself true, gets itself classed as true, by the way it works; grafting itself then upon the ancient body of truth, which thus grows much as a tree grows by the activity of a new layer of cambium."

Must we use truth to make truth true? "An opinion" that "counts as true" or a belief that is deemed to be true and is practically applied, need not be true. To Professor James truth is not the cash value of ideas, but their actual use when put into circulation. But truth remains truth even if not exploited. The cash value of a bank deposit remains the same even when we do not invest it in profitable enterprises, and it would certainly be a mistake to identify the nature of money with the interest it will bring if invested. What is commonly understood by "truth," Professor James calls "a static relation of 'correspondence'" and denounces it as "inert." In our opinion truth may indeed be inert, just as money may lie unutilized, but pragmatism shuts its eyes to the fact and denounces the old view as an inert conception of truth:

"It converts the absolutely empty notion of a static relation of 'correspondence' between our minds and reality, into that of a rich and active commerce (that any one may follow in detail and understand) between particular thoughts of ours, and the great universe of other experiences in which they play their parts and have their uses."

Our own conception of truth is neither "empty" nor "inert," for we believe that the truth is exceedingly practical, and (like many others before us) we have most vigorously insisted upon the maxim that truth must be sought and found, not to keep it in cold storage but that we may apply it in our own lives. The truth must be lived.

We have gone further; we have emphatically insisted on the principle that science, knowledge, truth, do not exist for their own sake but must prove helpful to us. We would not endorse the maxim "science for science's sake," as we said in *The Soul of Man*, p. 361: "The purpose of thinking is adaptation to surrounding conditions. Thought, you may object, sometimes does not end in action, but in the suppression of action. Inhibition, however, is an action also. Thought should always end in the regulation or adjustment of our behavior toward our surroundings. If it does not, it is not the right kind of thought. Thought for its own sake is a disease. If muscles contract neither for a special purpose nor for the general purpose of exercise, we call the contraction 'a cramp.' Thought for its own sake is a spasm of the brain."

While we regard a scientific inquiry into irrelevant truths as useless, and while we could gauge the importance of a truth by its practical significance, we deem it a very slipshod method of philosophizing to identify the utility of an idea with its truth. Yet this is actually the meaning of pragmatism according to Professor James (p. 75) who says:

"An idea is 'true' so long as to believe it is profitable to our lives."

If pragmatism means that our philosophy must be tested by its practical application, we are all pragmatists, and for myself I would claim to be a better pragmatist than Professor James.

THE OBJECTIVE SIGNIFICANCE OF TRUTH.

Professor James is right when he means to say that truth is not an object, not a thing outside of us, and that we must distinguish between facts and truths. Facts are real, they are in themselves neither untrue nor true. Truth resides in ideas only, viz., in representations or conceptions of facts. In this sense, therefore, I also say that truth originates in us, exactly because truth is a relation, which, strange to say, is denied by Professor James. Truth originates and exists through an agreement between the idea and the reality represented.

I will quote what I said on the subject years ago in an article on "The Origin of Mind"[5]: "Truth exists in thinking subjects only. Truth affirms that certain subjective representations of the objective world can be relied upon, that they are deduced from facts and agree with facts. Based upon past experience, they can be used as guides for future experience. If there were no subjective beings, no feeling and comprehending minds, there would be no truth. Facts in themselves, whether they are or are not represented in the mind of a feeling and thinking subject, are real, yet representations alone, supposing they agree with facts, are true."

While truth can exist in thinking beings only, while it is subjective in its nature, we must bear in mind that it has an objective significance. The several truths are not arbitrary statements, but their character is predetermined. If we are confronted with a scientific problem, we seek a solution, and if the problem is genuine and legitimate, there will be but one solution of it that is right, all others are either false or perhaps at best approximations. The solution that is predetermined, at which all inquirers that do not go astray must arrive, is the ideal of truth,

[5] *The Monist*, I, 69; reprinted in *The Soul of Man*, p. 42.

and this ideal must be discovered. Nor do we hesitate to say that although truth is an idea and not a concrete thing, not a material existence, not a fact, the ideal of truth, viz., its predetermination of the solution to be obtained, is the most significant presence in the world.

The identification of truth with mere workable belief is positively injurious. In limiting truth to its pragmatic significance, Professor James obliterates the most significant feature of truth. Charles S. Peirce, in the article referred to, describes most clearly the origin of belief and how an idea becomes accepted as true in the proportion in which it gratifies the individual's desire to assimilate it; it is accepted for subjective reasons and it affects our conduct in life. But in the name of logic how can we call an idea true, simply when or because it is held to be true? We grant that it appears true to those who hold it; let us even go so far as to say that it *is* true *to them*; but it need not for that reason be as yet really true. With all due respect for psychology we do not see why logic must needs be sacrificed in order to leave the field solely to psychology. The test of truth is its agreement with experience, not with one isolated fact or set of facts, but with all the facts of experience, and the ultimate agreement of all truths is the ideal of science.[6]

TRUTH MADE OR FOUND?

In spite of Professor James we insist that truth is not made by man, but must be discovered, for as we said above, the nature of truth is predetermined. Truth must be found; it is rigid and not plastic, it is independent of our likes and dislikes, and there is a pre-established harmony of all truths. Professor James does not brook truth in the singular. His "account of truth is an account of truths

[6] This idea has been developed in an editorial article entitled "The Criterion of Truth," published in *The Monist*, Vol. I, No. 2, p. 229.

in the plural" (p. 218), and he denounces truth in any other sense except his limited use of it. He says (pp. 64-65):

"The trail of the human serpent is thus over everything. Truth independent; truth that we find merely; truth no longer malleable to human need; truth incorrigible, in a word; such truth exists indeed superabundantly—or is supposed to exist by rationalistically minded thinkers; but then it means only the dead heart of the living tree, and its being there means only that truth also has its paleontology, and its 'prescription,' and may grow stiff with years of veteran service and petrified in men's regard by sheer antiquity."

Do scientists, inventors, and generally all who recognize the objective significance of truth, follow an *ignis fatuus*? Is it true that the laws established by science "are only a man-made language" (p. 57)? Professor James says:

"As the sciences have developed farther, the notion has gained ground that most, perhaps all, of our laws are only approximations. The laws themselves, moreover, have grown so numerous that there is no counting them; and so many rival formulations are proposed in all the branches of science that investigators have become accustomed to the notion that no theory is absolutely a transcript of reality, but that any one of them may from some point of view be useful."

In common parlance the word truth contains not only the idea of the correctness of our subjective notion but also the objective condition itself. We speak for instance of the eternality of truth, meaning thereby not the man-made formulas but the laws of nature, theorems of mathematics etc., and I have on former occasions proposed to call the latter "verities," so as to enable us to distinguish between the subjective and objective elements of truth.

ONENESS AND REASON.

In the chapter "The One and the Many" we had hoped to find a refutation of monism, and a justification of plural-

ism, but Professor James remains on the surface in his discussion of this contrast. Nowhere does he discover the ultimate reason of the unity which is such a powerful demand in the human mind. He seems to think that it is a question of number, not (as it actually is) of unity or consistency, and suggests that the oneness of the universe would exclude variety and multiplicity. He says:

"The world is One just so far as its parts hang together by any definite connection. It is many just so far as any definite connection fails to obtain."

The human mind which naturally and necessarily views the world as one is viewed by him psychologically in its complex elements as a plurality. He says:

"Our minds thus grow in spots; and like grease-spots, the spots spread."

Apparently he has never become acquainted with a justification of the monistic tendency that pervades science. He overlooks the fact that reason is a unity, and that in its gradual evolution it has developed under the influence of the principle of oneness. An explanation of the nature of reason is no easy task and would take more space than we can give it in this article, but we will try to state it in as few words as possible.

The problem of reason is the problem of formal thought. We distinguish between the sense element in our experience and the relational or formal. The pure form of actual succession in motion is time. The pure form of thought is logic. The general rules which we derive from pure forms can be formulated in general statements which we find to be reliable norms not only for the subjective sphere of reasoning, but also in the objective domain of existence. The norms of the purely formal are the same throughout, which appears first of all in the fact that for all of us there is but one space, one time, one reason. Though meta-

geometricians have tampered with the conception of space, the philosophers have not dared as yet to touch time or to doubt the sameness, oneness and harmonious unity and the uniqueness of reason. We have been hoping from year to year that some one would invent a two-dimensional time, or some supra-, infra- or extra-temporal chronometry, or that a metalogician would publish a book on curved reason, or propound a pluralistic logic that would stand in contradiction to the Aristotelian logic in which the categories would not hold good, and where the law of contradiction would have no application.

Here is a task worthy the efforts of the pragmatist. Perhaps Mr. Charles S. Peirce can offer additional suggestions. What glorious vistas for the philosopher of the future! In the meantime we venture to think that so long as the unity of reason stands unchallenged, the pragmatist has no right to doubt the ultimate unity of the world.

THE MIND AND THE UNIVERSE.

The best justification of monism is the constitution of the human mind. Professor James himself recognizes our craving for consistency, for unity, for a harmony of all truths; and is not the human mind a product of the universe? Is not its unity as well as its need of tracing the unity of things, an echo of the unity (i. e., the harmoniousness, or consistency) in the constitution of the world?

Lotze said somewhere about the mind and its relation to reality, "May not previous reality itself be there (viz., in the mind)?", and the passage is quoted by Professor James with approval. I would indeed say that some feature of reality exists in the mind, and it is exactly that principle of oneness which appears in reason. It is founded upon our conception of form, and the conception of form arises from our becoming conscious of the uniformities which are inseparably connected with all reality, objective

as well as subjective. We reproduce the oneness, or let us rather say the universal sameness, of all form in our formulations of the norms of form and of the natural laws, and this is the condition of the oneness of reason, and of the principle of consistency so important in science and philosophy. This principle of oneness otherwise called "reason" is a feature of reality which has been developed in the mind and is a reflection only of the oneness of the universe. Of it every being is a part and into the image of it the intellect of rational beings has been molded.

Near the conclusion of his chapter on "Humanism," Professor James sums up the case as follows:

> "The import of the difference between pragmatism and rationalism is now in sight throughout its whole extent. The essential contrast is that for rationalism reality is ready-made and complete from all eternity, while for pragmatism it is still in the making, and awaits part of its complexion from the future. On the one side the universe is absolutely secure, on the other it is still pursuing its adventures."

We do not mean to defend what Professor James attacks as rationalism, but will say that in our opinion reality is a constant flux and accordingly is never ready made or complete. It is always changing in a kaleidoscopic manner. What is really complete from all eternity is the constitution of the world, and it is this constitution which is reflected in man's reason. The constitution of the world is not an unintelligible enigma, but it is the systematic unit of norms of its formal relations, and human reason is the totality of the formal relations of thought reduced to logical rules.

Professor James uses the term "reality" first in the sense of the world-constitution, and then in the sense of the unstable condition of nature. If rationalism means that reality is ready made, it can only mean that the constitution of the world, the sum total of natural laws, is im-

mutable. If pragmatism means that reality is still in the making, he can reasonably refer only to nature with all its bodily existences the very condition of which is always instability; but in thus using his words with no definite meaning Professor James succeeds in pointing out the advantages of his philosophy and representing the views of the rationalists, the intellectualists, and the monists as utterly untenable.

Professor James recognizes uniformity of nature, but it is only a general and vague idea. He says:

"The general 'uniformity of nature' is presupposed by every lesser law. But nature may be only approximately uniform."

TIME AND SPACE.

We ought to let pragmatism swallow its own medicine and request it to become pragmatic, which means to measure values according to the practical use of things. Would it then not learn to appreciate theory, abstraction, the principle of consistency, logic and in general intellectualism and rationalism even in preference to mood, temperament, sentiment and the gratification of other purely subjective dispositions?

Has not the logical faculty developed solely for the pragmatic reason that the simian brute was thereby changed into rational man? Does not the whole apparatus of abstract thought serve very practical purposes, and is it really so desirable to live in facts only and ignore all these useful implements of theory, abstraction, and generalization? Does not even monism, or rather the systematic method of reducing the plurality of our sensations to unity, serve a very practical purpose? If we had to surrender all these methods simply because they are mental constructions and artifices invented for the simplification of knowledge, because they do not possess the same reality

as do our sensations, our sense experience, and our sentiments, would we not sink back to the level of childhood?

To characterize the situation we will quote the passage on time and space on pp. 177-178:

"That one Time which we all believe in and in which each event has its definite date, that one Space in which each thing has its position, these abstract notions unify the world incomparably; but in their finished shape as concepts how different they are from the loose unordered time-and-space experiences of natural men! Everything that happens to us brings its own duration and extension, and both are vaguely surrounded by a marginal 'more' that runs into the duration and extension of the next thing that comes. But we soon lose all our definite bearings; and not only do our children make no distinction between yesterday and the day before yesterday, the whole past being churned up together, but we adults still do so whenever the times are large. It is the same with spaces. On a map I distinctly see the relation of London, Constantinople, and Pekin to the place where I am; in reality I utterly fail to feel the facts which the map symbolizes. The directions and distances are vague, confused and mixed. Cosmic space and cosmic time, so far from being the intuitions that Kant said they were, are constructions as patently artificial as any that science can show. The great majority of the human race never use these notions, but live in plural times and spaces, interpenetrant and *durcheinander*."

This passage is characteristic.

Time is one and space is one; no one doubts it. Yet "our time and space experiences" are "vague, confused and mixed."

When using the map Professor James "can distinctly see the relation of London, Constantinople and Pekin to the place where he is"; but he "utterly fails to see the facts which the map symbolizes." Should we not conclude then that these artificial constructions are of paramount pragmatic importance? And that the intellectualists and rationalists have not labored in vain? My conclusion points that way, and I am convinced that Professor James has misinterpreted their philosophies as much as he fails

to understand Kant. Kant says that time and space are *Anschauungen*, which means that they are data of immediate experience as much as are the objects of sight. The translation "intuition" carries with it a mysterious and mystical meaning which is utterly absent in the German text and was absolutely foreign to Kant.[7]

Considering the fact that the illiterate and the uncultured can still be found in all the continents of the earth, we will not dispute the statement, that "the great majority of the human race. . . . live in plural times and spaces, interpenetrant and *durcheinander*." Still we do not see what renders the notion of the oneness of time and space objectionable, and fail to appreciate the advantage of pluralism.

LOVE OF FACTS AND MYSTICISM.

In his dread of abstractions Professor James forgets or loses sight of the fact that man has acquired his humanity through his reason and that reason is the faculty of thinking in abstractions. We grant that abstractions that have no reference to facts are either empty and useless or even positively erroneous, but because there are wrong abstractions we can not overlook the paramount importance of abstract thought. Professor James says:

"Pragmatism is uncomfortable away from facts. Rationalism is comfortable only in the presence of abstractions. This pragmatist talk about truths in the plural, about their utility and satisfactoriness, about the success with which they 'work,' etc., suggests to the typical intellectualist mind a sort of coarse lame second-rate makeshift article of truth."

The pragmatist seems to adopt the principle of positivism in that he clings to facts. Sometimes it will be difficult to distinguish between facts and our interpretation of facts, but pragmatism offers no objective criterion for a distinction between the two. We read on p. 68:

[7] Compare the author's article "What Does Anschauung Mean?" in *The Monist*, II, 527, and in *Kant and Spencer*, p 33 ff.

"The pragmatist clings to facts and concreteness, observes truth at its work in particular cases, and generalizes. Truth, for him, becomes a class-name for all sorts of definite working-values in experience."

This might be construed as discarding everything that is not particular and concrete sense-experience; but it would be wrong to think that Professor James does not cherish a belief in some reality above the facts of sense. Indeed, his great interest in mystical phenomena proves it, and he uses a very pretty allegory to justify his belief in some superreal world which interacts with the world of sense in which we live, and yet constitutes a sphere of its own and is the product of theory. The recognition of the reality of this abstract realm is so ingenuous and it stands in such a contrast, I might almost say in contradiction, to so many of Professor James's utterances that we will quote the passage in full in order to show how Professor James justifies his eccentric excursions into the realm of the abstruse. He says (pp. 127-128):

"I have sometimes thought of the phenomenon called 'total reflection' in Optics as a good symbol of the relation between abstract ideas and concrete realities, as pragmatism conceives it. Hold a tumbler of water a little above your eyes and look up through the water at its surface—or better still look similarly through the flat wall of an aquarium. You will then see an extraordinarily brilliant reflected image say of a candle-flame, or any other clear object, situated on the opposite side of the vessel. No ray, under these circumstances gets beyond the water's surface: every ray is totally reflected back into the depths again. Now let the water represent the world of sensible facts, and let the air above it represent the world of abstract ideas. Both worlds are real, of course, and interact; but they interact only at their boundary, and the *locus* of everything that lives, and happens to us, so far as full experience goes, is the water. We are like fishes swimming in the sea of sense, bounded above by the superior element, but unable to breathe it pure or penetrate it. We get our oxygen from it, however, we touch it incessantly, now in this part, now in that, and every time we touch

it, we turn back into the water with our course re-determined and re-energized. The abstract ideas of which the air consists are indispensable for life, but irrespirable by themselves, as it were, and only active in their re-directing function. All similes are halting, but this one rather takes my fancy. It shows how something, not sufficient for life in itself, may nevertheless be an effective determinant of life elsewhere."

Dreams are realities to the visionary, and the mystic does not hesitate to look upon the most abstruse theories of his imagination as facts. If we want to know the truth, we must learn to distinguish between the objective fact and our interpretation of it.

MISUNDERSTOOD.

Professor James emphasizes one aspect of the truth only and loses sight of another that is of greater importance. He himself feels that he speaks in paradoxes, and so he says of his definition of truth:

"But is it not a strange misuse of the word 'truth,' you will say, to call ideas also 'true' for this reason?"

When Professor James identifies that which is profitable, satisfactory, better to believe, etc., with truth, he says to his reader in anticipation of his misgivings:

"Probably you also agree, so far as the abstract statement goes, but with a suspicion that if we practically did believe everything that made for good in our own personal lives, we should be found indulging all kinds of fancies about this world's affairs, and all kinds of sentimental superstitions about a world hereafter. Your suspicion here is undoubtedly well founded."

Professor James grants that our suspicion is "well-founded, but he does not trouble to remove the suspicion. He simply adds:

"It is evident that something happens when you pass from the abstract to the concrete that complicates the situation."

Man possesses a very inconvenient hankering for consistency, and when he adopts an idea as true because he finds that it is expedient to believe it, it sometimes happens that it clashes with other beliefs of vital benefit. Professor James refers to this problem, and if he had solved it he would have discovered that the old-fashioned ideal of the oneness of truth contains a lesson, but he fears to lose himself in the absolute, and he loves pluralism too much to make the attempt. On page 77 Professor James says:

"I said just now that what is better for us to believe is true unless the belief incidentally clashes with some other vital benefit. Now in real life what vital benefits is any particular belief of ours most liable to clash with? What indeed except the vital benefits yielded by other beliefs when these prove incompatible with the first ones? In other words, the greatest enemy of any one of our truths may be the rest of our truths. Truths have once for all this desperate instinct of self-preservation and of desire to extinguish whatever contradicts them. My belief in the Absolute, based on the good it does me, must run the gauntlet of all my other beliefs."

And how does Professor James escape the difficulty? His answer is made in a whisper:

"Let me speak now confidentially, as it were, and merely in my own private person,—it clashes with other truths of mine whose benefits I hate to give up on its account. It happens to be associated with a kind of logic of which I am the enemy, I find that it entangles me in metaphysical paradoxes that are inacceptable, etc., etc. But as I have enough trouble in life already without adding the trouble of carrying these intellectual inconsistencies, I personally just give up the Absolute. I just take my moral holidays; or else as a professional philosopher, I try to justify them by some other principle."

This looks very much like a surrender of truth in order to let a belief that at the time is profitable, count as a truth. And yet woe to any one who would point this out to Professor James! He says on page 233:

"These pragmatists destroy all objective standards, critics say,

and put foolishness and wisdom on one level. A favorite formula for describing Mr. Schiller's doctrines and mine is that we are persons who think that by saying whatever you find it pleasant to say and calling it truth you fulfil every pragmatistic requirement. I leave it to you to judge whether this be not an impudent slander."

Professor James is very good-natured and can smile at criticism, but here he loses his temper. He adds:

"The unwillingness of some of our critics to read any but the silliest of possible meanings into our statements is as discreditable to their imaginations as anything I know in recent philosophic history."

Is it sheer modesty when Professor James speaks of his discourse as so far having been "crude in an unpardonable, nay, in an almost incredible degree"? (p. 33).

He seems to be in the habit of sometimes saying what he does not mean and then blames the world for misunderstanding him. Here is his own statement:

"I once wrote an essay on our right to believe, which I unluckily called the Will to Believe. All the critics, neglecting the essay, pounced upon the title. Psychologically it was impossible, morally it was iniquitous."

Now it seems to me that the most important sentence written in an essay is its title. It is in the light of the title that the reader reads the whole essay, and if the title reads "The Will to Believe" it is likely that the author really means that which he puts in the most conspicuous place. Moreover I would add that although the essay may be wrongly entitled "The Will to Believe," it actually reflects the author's meaning. He has certainly no right to blame the readers for misunderstanding him. Nevertheless Professor James loses his temper and blames his critics as "iniquitous."

Some of his critics, however, may not have missed his meaning when they attributed to him the proposition that it is the right of everybody to believe as he wills, and that the will (i. e., the idiosyncrasies) of every man is the main

factor in the makeup of his belief and that arguments are of no avail. In the present volume, on page 296, Professor James says:

"In the end it is our faith and not our logic that decides such questions, and I deny the right of any pretended logic to veto my own faith."

Professor James is possessed of an exuberance of temperament, and in his philosophy temperament rules supreme. He claims for his faith the right to be impervious to logic; and he denies the right of any pretended logic to veto his own faith. Of course that closes the case and all argument must cease.

In the meantime I must confess that my temperament differs, for my convictions have been profoundly influenced by logical argument, and there are many other people in the same plight as I am. In fact I know that whole nations have changed their faith under the influence of purely intellectual considerations; yea, I have some slight suspicion that Professor James himself can not entirely withdraw himself from the influence of logic, and it may be a mistake to take his utterances too seriously.

It may be that even the present book on pragmatism contains statements which, by some ill luck, Professor James did not mean, and that when we criticize him we stand in the same condemnation as the critics of his essay on "The Right to Believe."

We do not wish to misrepresent Professor James and have therefore characterized his pragmatism in his own words. We grant that he believes in truth, but his several definitions and expositions of his conception of truth are either wrong or misleading, and though he may not actually deny the objective standard of truth, he elevates mere subjective belief to the dignity of the name truth which, if this were justifiable, would practically render the latter irrelevant. Indeed he glories in this looseness of

truth which ignores the ideal of both the objectivity and the oneness of truth for the sake of its subjective conceptions, resulting in Protean truths in the plural.

THE PERSONAL EQUATION.

It is very difficult to obtain objective statements of fact because a subjective element enters into every observation and consequently also into every presentation of a fact. It is the ambition of the scientist to reduce the personal element and, whenever possible, to eliminate it.

Professor James says:

"Of whatever temperament a professional philosopher is, he tries, when philosophizing, to sink the fact of his temperament. Temperament is no conventionally recognized reason, so he urges impersonal reasons only for his conclusions. Yet his temperament really gives him a stronger bias than any of his more strictly objective premises. It loads the evidence for him one way or the other, making for a more sentimental or a more hard-hearted view of the universe, just as this fact or that principle would. He trusts his temperament. Wanting a universe that suits it, he believes in any representation of the universe that does suit it."

This passage contains the key to the philosophical doctrine of Professor James. He possesses a very temperamental personality, and he judges others from himself. Scientific inquiry indeed demands that the scientist should sink his own personality before the cause of truth. His temperament has nothing to do with the facts he investigates; if permitted to interfere with his investigation it can only vitiate his arguments and lack of self-control is pathological. In Professor James, thought and sentiment are so intricately interwoven that his preferences enter into his conclusions; his temperament is always one of his premises, and to pass it by in silence seems to him hypocritical. He says:

"There arises thus a certain insincerity in our philosophic discussions: the potentest of all our premises is never mentioned."

We do not deny that one's personal attitude is an important factor in life, nor would we object to an author who with ability and grace descants on any subject in his peculiar characteristic mood, but he must not claim that his effusions are philosophy. Let him announce his lectures as rhapsodies and publish his books under the name of poetry; we will gladly welcome him as the creator of a new department in literature. But it is not philosophy. and least of all, what is so strongly needed in our day, a philosophy of science, a philosophy that is worth while studying and which is a desideratum of scientists.

Professor James is an empiricist. He "turns his back resolutely and once for all upon a lot of inveterate habits dear to professional philosophers. He turns away from abstractions. . . . from fixed principles, closed systems. . . . He turns towards concreteness and adequacy, towards facts, towards action and towards power." He adds p. 51:

"That means the empiricist temper regnant and the rationalist temper sincerely given up."

But the facts of Professor James are not facts in the usual sense of the word. They are psychical states, attitudes, and interpretations of facts. An hallucination is most assuredly a fact too. The sensation experienced by a man who sees a ghost is a fact; but his experience may be the expression of a wrong interpretation. Another man under the same conditions may see a shirt on a clothes line; that too is a fact and an interpretation. Both facts of interpretation appear contradictory, and men of a rationalist temper will not rest satisfied until the contradiction is removed. The pragmatism of Professor James is pluralistic, and different interpretations remain peacefully side by side. If we can not eliminate the personal equation and must accept moods as facts, all interpretations are equally true. This renders the conception of truth elusive, or as Professor James calls it, "plastic."

THE PLASTICITY OF TRUTH.

The plasticity of truth makes pragmatism elastic and this playing fast and loose with truth is deemed a great advantage. It makes "pragmatism a mediator and reconciler," for "she 'unstiffens' our theories" (p. 79). Thus it is possible that pragmatism may be acceptable to all,—the materialist and the spiritualist, the infidel and the unbeliever, the skeptic, the mystic, the visionary, and what not. We are told:

> "It has no dogmas, and no doctrines save its methods. As the young Italian pragmatist Papini has well said, it lies in the midst of our theories, like a corridor in a hotel. Innumerable chambers open out of it. In one you may find a man writing an atheistic volume; in the next some one on his knees praying for faith and strength; in a third a chemist investigating a body's properties. In a fourth a system of idealistic metaphysics is being excogitated: in a fifth the impossibility of metaphysics is being shown. But they all own the corridor, and all must pass through it if they want a practicable way of getting into or out of their respective rooms."

The excuse for ignoring the ideal of truth, so important in our conception of the world, is stated by Professor James as follows:

> "The 'absolutely' true, meaning what no farther experience will ever alter, is that ideal vanishing-point towards which we imagine that all our temporary truths will some day converge. It runs on all fours with the perfectly wise man, and with the absolutely complete experience; and, if these ideals are ever realized, they will all be realized together. Meanwhile we have to live to-day by what truth we can get to-day, and be ready to-morrow to call it falsehood."

I would not characterize the ideal of truth by which I understand that solution of a problem which is predetermined, as "the 'absolutely' true." There is nothing "absolute" in it, and by using the word "absolute" (albeit not in its proper meaning, but in a loose way in the sense of

"positive"), we introduce an idea which spreads vagueness. It makes a final truth appear as an "ideal vanishing point," i. e., an unrealizable quantity at an infinite distance. I grant Professor James that "we must live to-day by what truth we can get to-day," but I deny that we must "be ready to call it falsehood to-morrow." This view is based upon an utter misapprehension of the nature of truth.

I beg leave to belong to the old-fashioned people who still believe that all truths must agree and that the truth of yesterday will be the truth of to-morrow. Here lies the rock of ages which is the basis of science. If this rock should prove an illusion, then indeed pluralism would be established for good, and pluralism would look very much like nihilism. But let us hear what Professor James has to say on the variability of truth:

"Ptolemaic astronomy, Euclidean space, Aristotelian logic, scholastic metaphysics, were expedient for centuries, but human experience has boiled over those limits, and we now call these things only relatively true, or true within those borders of experience. 'Absolutely' they are false; for we know that those limits were casual, and might have been transcended by past theorists just as they are by present thinkers."

We will take up each single statement by itself.

PTOLEMY AND COPERNICUS.

Ptolemaic astronomy was not true at the time of Ptolemy; it never was true, nor ever will be true. What from our standpoint Professor James can reasonably mean is this, that Ptolemaic astronomy satisfied certain demands of scientific inquiry in the time when Alexandria was flourishing. It summarizes certain facts in a better way than was done in the views that were held by Ptolemy's predecessors except Endoxus who seems to have been nearer the truth than Ptolemy. Only in so far as it systematized some observations, can we say that the Ptolemaic system was

correctly formulated; but it was not true even at the time, because it did not satisfy all observations, and the astronomy of that age had to slur over those observations which clashed with the theory. But Ptolemy and his followers "had enough trouble in life already without adding the trouble of carrying these intellectual inconsistencies." Their calculations were sufficiently complicated and so they took a holiday and thought that their system worked well enough for their own needs. In other words they turned pragmatists and ceased to trouble about consistency.

We might enter here upon a discussion of the right to choose a point of reference. We have a right to use the earth as a point of reference as did the Ptolemaic astronomers; and we have a right to use the sun as our point of reference as did Copernicus. The former is as much justified as the latter, and the advantage of the latter consists solely in rendering the calculation more simple. That is true enough according to assumption, but to use this as an argument for the purpose of making Ptolemaic astronomy appear to be as true as the Copernican system would be mere quibbling. This inability to take the right point of reference which would render the calculation of the planetary movements simple, is exactly what constituted the fault of Ptolemaic astronomers, and veiled from them the fact that the earth is a planet among the other planets.

We do not deny that the progress of science is by approximation, and the Ptolemaic system is indeed an approximation of the attempt to calculate and predict certain events in the starry heavens; but one of its premises was wrong, and it prevented its supporters from solving the astronomical problem satisfactorily. This wrong premise which was their idea of the fixed position of the earth in the center of the solar system, was eliminated by Copernicus who recognized that the earth had to be classed together with the planets, and the problem was finally solved

by Kepler through the formulation of the laws which bear his name.

Kepler has definitely solved the problem. He has not solved all the problems of astronomy, but I would like to see the astronomer who would be ready to call the three laws of Kepler falsehoods to-morrow.

The same may be said of the problem of the acceleration of gravity. Gravity itself taken as a fact, the Newtonian formula is final. It satisfies all instances of gravitating bodies. The question of fact "why does gravity act at all?" remains, but that being granted as a matter of fact, the formula is valid.

EUCLID AND ARISTOTLE.

The last century has witnessed a remarkable progress in mathematics and logic in the invention of non-Euclidean geometries and the suggestion of new truths in logic, and this is used to advantage by Professor James to prove the plasticity of truth. He says:

> "How plastic even the oldest truths nevertheless really are has been vividly shown in our day by the transformation of logical and mathematical ideas, a transformation which seems even to be invading physics."

Does Professor James mean to say that Euclidean geometry and Aristotelian logic have ceased to be true? Scarcely. Euclid's geometry holds good to-day as well as in Euclid's time, and the same is true of Aristotle's logic. Professor James himself knows it, for he adds:

> "The ancient formulas are reinterpreted as special expressions of much wider principles, principles that our ancestors never got a glimpse of in their present shape and formulation."

A wider interpretation of an old truth does not make the old truth false, but widens and deepens our comprehension of it. That is a big difference, and the same is

true of all truths. A truth once positively proved to be a truth is and will remain a truth forever.

But what of the discovery of new facts such as the Röntgen rays, and radium? Do they not upset science and render the most basic truth antiquated? We can hear this statement often enough, but we have not yet seen the day on which it was verified. The discovery of new facts may upset pet theories of ours, but it will never upset old truths, not even those which have become paleontological with age. If formulas describe certain features of facts without any admixture of theory, they will remain true forever. In case we should learn something about the ultimate constitution of matter which would reveal to us the secret of gravity, we would not have to discard the Newtonian formula of the mutual attraction of masses as a falsehood, but we would see its truth in a clearer light. In other words, we would not replace one truth that has become antiquated by another truth that is more up to date and happens to agree with the present fashion of our intellectual atmosphere, but we would add to the old truth a new truth, and the unity of all the truths we know would thereby only become the more apparent.

MATERIALISM AND SPIRITUALISM.

Professor James knows how to put his paints on thick, and so his pictures exhibit strong contrasts. He generally omits the softer tones between the opposites and so fails to find that the truth lies in the middle. Take for instance his ingenious description of materialism (on pp. 92-93) which is contrasted to theism and spiritualism.

"Philosophical materialism is not necessarily knit up with belief in 'matter,' as a metaphysical principle. One may deny matter in that sense, as strongly as Berkeley did, one may be phenomenalist like Huxley, and yet one may still be a materialist in the wider sense, of explaining higher phenomena by lower ones, and leaving

the destinies of the world at the mercy of its blinder parts and forces. It is in this wider sense of the word that materialism is opposed to spiritualism or theism. The laws of physical nature are what run things, materialism says.

"The highest productions of human genius might be ciphered by one who had complete acquaintance with the facts, out of their physiological conditions, regardless whether nature be there only for our minds, as idealists contend, or not. Our minds in any case would have to record the kind of nature it is, and write it down as operating through blind laws of physics. This is the complexion of present-day materialism, which may better be called naturalism. Over against it stands 'theism,' or what in a wide sense may be termed 'spiritualism.' Spiritualism says that mind not only witnesses and records things, but also runs and operates them: the world being thus guided, not by its lower, but by its higher element."

According to Professor James every naturalist would have to be classed with the materialists, and according to his division, which with all its faults and in spite of its being based upon a wrong generalization has the advantage of a drastic vividness, I would myself count as a materialist. And yet I protest against calling the laws of nature blind, and while I would attempt to explain higher phenomena from lower ones I would not have the higher degraded into the lower. Man does not become a brute if his pedigree can be traced back to brute animals and still further back to moners or amœbas. For all that, man's soul has been molded not by matter but by the formative factors of the world in which all things exist and move and have their being.

The romantic temperament of Professor James appears not only in his spiritualism but also in his theology, for even here pluralism enters. He says:

"Monotheism itself, so far as it was religious and not a scheme of classroom instruction for the metaphysicians, has always viewed God as but one helper, *primus inter pares*, in the midst of all the shapers of the great world's fate."

RELIGIOUS PROBLEMS.

Pragmatism applied to religion has great advantages. Says Professor James:

"It follows that in the religious field she [pragmatism] is at a great advantage both over positivistic empiricism, with its anti-theological bias, and over religious rationalism, with its exclusive interest in the remote, the noble, the simple, and the abstract in the way of conception.

"In short, she widens the field of search for God. Rationalism sticks to logic and the empyrean. Empiricism sticks to the external senses. Pragmatism is willing to take anything, to follow either logic or the senses and to count the humblest and most personal experiences. She will count mystical experiences if they have practical consequences. She will take a God who lives in the very dirt of private fact—if that should seem a likely place to find him.

"Her only test of probable truth is what works best in the way of leading us, what fits every part of life best and combines with the collectivity of experience's demands, nothing being omitted. If theological ideas should do this, if the notion of God, in particular, should prove to do it, how could pragmatism possibly deny God's existence? She could see no meaning in treating as 'not true' a notion that was pragmatically so successful. What other kind of truth could there be, for her, than all this agreement with concrete reality?"

The issue between atheism and theism, and materialism and spiritualism, before the tribunal of pragmatism becomes "little more than a conflict between esthetic preferences" (page 94). Professor James says:

"What practical difference can it make now that the world should be run by matter or by spirit?....

"The pragmatist must consequently say that the two theories, in spite of their different-sounding names, mean exactly the same thing.....

"And how, experience being what is once for all, would God's presence in it make it any more living or richer? Candidly, it is impossible to give any answer to this question.....

"Thus if no future detail of experience or conduct is to be de-

duced from our hypothesis, the debate between materialism and theism becomes quite idle and insignificant. Matter and God in that event mean exactly the same thing—the power, namely, neither more nor less, that could make just this completed world—and the wise man is he who in such a case would turn his back on such a supererogatory discussion."

It would seem quite indifferent then whether God or law, or matter, or energy, or whatever other principle ruled the world. Professor James says in this connection:

"Doing practically all that a God can do, it is equivalent to God, its function is a God's function, and in a world in which a God would be superfluous; from such a world a God could never lawfully be missed."

Pragmatism recognizing the plurality of truths need not be consistent, and so Professor James sees nevertheless a difference between materialism and spiritualism, and he gives his preference to the latter, not because he can prove that it is truer but because spiritualism is a doctrine of promise, of hope, of consolation, and the same is true of some other metaphysical problems, such as free will, design in nature etc.

Professor James says:

"Materialism means simply the denial that the moral order is eternal, and the cutting off of ultimate hopes; spiritualism means the affirmation of an eternal moral order and the letting loose of hope.....

"Spiritualistic faith in all its forms deals with a world of promise, while materialism's sun sets in a sea of disappointment.....

"Free-will thus has no meaning unless it be a doctrine of relief.....

"Other than this practical significance, the words God, free-will, design, etc., have none."

Professor James appears to have an aversion to arguments. They smack of intellectualism which is an abomination in his eyes. His preference is based upon sentimental grounds.

It stands to reason that those who have worked out doctrines and theories and dogmas, who have endeavored to have them promulgated, adopted and believed in, have done so because they were conscious of the practical significance of their propositions, but Professor James imputes to them the idea that they have lost sight of facts, and that their ultimate questions are "something august and exalted above facts." His pragmatism only gives meaning to theories which otherwise would have been senseless. He says:

> "See then how all these ultimate questions turn, as it were, upon their hinges; and from looking backwards upon principles, upon an *erkenntnisstheoretisches Ich*, a God, a *Kausalitätsprinzip*, a Design, a Free-will, taken in themselves, as something august and exalted above facts,—see, I say, how pragmatism shifts the emphasis and looks forward into facts themselves."

We cherish the opinion that every belief has been framed with a practical intent (or in adaptation to Professor James we may say, for a "pragmatic" purpose) and in order to find out the significance of a theory we ought to see how it works. The intellectual struggle concerning God, the soul, and immortality have not been mere quibbles in our opinion, and we trust that the problems of philosophy can be correctly formulated and solved.

I believe that we can define God in terms of experience and say with exactness what is true of the idea of God and what is not true. I believe myself that the theist and the atheist may come to terms, but two contradictory ideas can not for that reason both be true. An idea (such as the God idea) may be approximately true. It may contain an important truth dressed up in an allegorical garb. The atheist is right when he negates the allegorical formulation of it, he is wrong when he negates the spirit of the dogma; and *vice versa*, the theist is wrong when he insists on the allegory as being literally true, but he is right when he

recognizes the essential part of it that is backed up by facts, and insists upon it.[8]

MR. CHARLES S. PEIRCE'S TYCHISM.

Our readers may have noticed that since "pragmatism" has become the watchword of a new and popular movement with which Mr. Peirce, the inventor of the term, does not appear to be in full accord, he has introduced the word "pragmaticism" as if to point out the difference between his own philosophy and that of Professor James.

I regret that I shall not be able to enter here into a discussion of the views of Mr. Charles S. Peirce whose conception of the instability of natural laws is one of the most original and most ingenious theories ever brought forth. I will only briefly refer our readers to the vigorous controversy with him which has appeared in *The Monist*,[9] where he defends the doctrine of tychism versus necessitarianism, while I take the opposite position. Mr. Peirce believes that natural laws are the product of evolution. In the beginning there was Chance (*Tyche*). Chance is not subject to law, it is free as we know spirit to be. Chance acts arbitrarily but gradually it took on habits and habits became more and more solidified and hardened into laws. Hence the order of the universe is not the cause of evolution but its product.

It is not impossible that Professor James follows Mr. Peirce, for there is a passage which seems to justify this assumption. Professor James says on p. 249:

> "Between categories fulminated before nature began, and categories gradually forming themselves in nature's presence, the whole chasm between rationalism and empiricism yawns."

In another passage (p. 158-9) we read:

[8] For details see my discussions on the God problem, especially in *The Monist*, Vol. IX, p. 106. A book on the subject is in preparation.

[9] Compare *The Monist*, Vol. II, pp. 321 ff., 442 ff.; and III, pp. 526 ff. and 571 ff.

"With the whole of past eternity open for our conjectures to range in, it may be lawful to wonder whether the various kinds of union now realized in the universe that we inhabit may not possibly have been successively evolved after the fashion in which we now see human systems evolving in consequence of human needs. If such an hypothesis were legitimate, total oneness would appear at the end of things rather than at their origin. In other words the notion of the 'Absolute' would have to be replaced by that of the 'Ultimate.'"

The language of Professor James is poetic, not exact. What he means is not that the rationalist (i. e., a man like Kant) believed that the categories fulminated before nature began, but that the categories, or better the entire cosmic order, is an eternal condition uncreated and indestructible, while the empiricist (or the pragmatist) believes that the categories are a product of evolution.

We may incidentally call our readers' attentions to the first chapter in Prof. Benjamin Peirce's *Analytic Mechanism*, where the father of the founder of pragmatism utters a few brief suggestions which seem to have taken deep root in the soul of his son. Benjamin Peirce regarded "matter as inert" and thought that "force may be regarded as having a spiritual origin."

THE ENEMIES OF PRAGMATISM.

Pragmatism is a philosophy manufactured to suit all; it is pluralistic and tolerates any amount of diversity of opinion; it ought to have no enemies, for every one can be, and according to Professor James ought to be, a pragmatist; but his book on pragmatism is in parts extremely pugnacious, his enemies being the monist, the rationalist, the intellectualist, and their ilk. For reasons unknown to me Professor James complains most of the monists. He says:

"The temper of monists has been so vehement, as almost at times to be convulsive."

I am sure I am innocent. The present article is my first attack on pragmatism.

It is strange that the pragmatist welcomes every one except men of theory, and to them he imputes all kinds of erroneous notions.

The reader will ask why the pragmatist who welcomes every vagary of the human mind and whose tolerance is unbounded, should decry in pretty harsh terms monism, intellectualism and rationalism. Pragmatism, according to Professor James, is the philosophy of temperament, of mood, of personal attitude, and so he naturally resents whatever would put a check upon the liberty of his preferences. He imputes to the intellectualist the slogan:

"Down with psychology, up with logic, in all this question!"

Professor James himself wants the vagueness of psychological moods recognized as philosophy, and he scorns logic. He has no patience with a thinker who demands consistency or endeavors to systematize the plurality of facts. Scientific exactness appears to the pragmatist as mere pedantry. Professor James says:

"The actual universe is a thing wide open, but rationalism makes systems, and systems must be closed."

Professor James's philosophy can dispense with system. He says:

"We measure the total character of the universe as we feel it, against the flavor of the philosophy proffered us, and one word is enough.

" 'Statt der lebendigen Natur,' we say, 'da Gott die Menschen schuf hinein,'—that nebulous concoction, that wooden, that straight-laced thing, that crabbed artificiality, that musty schoolroom product, that sick man's dream! Away with it. Away with all of them! Impossible! Impossible!"

The pragmatist says, *"Gefühl ist Alles*—we need neither intellect, nor reason, nor a systematization of facts, nor theories, nor abstractions. We live in facts."

Professor James censures some views with regard to the importance of the intellect and the indispensableness of reason, which are commonly held by believers in monism, but these propositions are so strangely adulterated with notions which are scarcely held by any one, that we wonder who these sorry enemies of Professor James may be, and we are inclined to regard them as men of straw who do not possess a concrete existence.

We are told that according to the intellectualist "truth means essentially an inert static relation" (p. 200), and in another passage that, "for the rationalist it remains a pure abstraction to the bare name of which we must defer" (p. 68).

It is difficult to find out who is meant be intellectualists and rationalists, for we have yet to meet the man to whom truth remains "a pure abstraction" or who would insist that truth should be "inert." Clifford has already pointed out with great clearness that every scientific truth is a norm of conduct and can be expressed as such. Further it is a truism that scientists formulate truths in abstract terms, but they always bear in mind that their formulas are generalizations from actual facts, and that they describe certain features of reality. The truth or untruth of these formulas depends upon the correspondence of the ideas with the facts in question. Truth accordingly does not reside in the abstraction alone, but depends upon the relation of the abstraction to facts. Cancel the facts, and where is truth?

Theories are attempts at explaining facts by the assumption of other facts. If these other facts are verified, the theory is regarded true and may then be justly called a law of nature. A law of nature is always (or at least should be) a systematic description of a certain group of facts.

We often hear abstractions and generalizations denounced as empty, but that is merely the prattle of those

who do not know that all abstractions signify definite features of facts.

THE PHILOSOPHY OF TOLERANCE.

In the April *Monist* Professor John E. Boodin, of the department of philosophy at the University of Kansas, contributed an article on "Philosophic Tolerance" which is very well written and shows the inclination of the writer to the pragmatic movement. The title is significant, and the essay might be called a pragmatic rhapsody. It is pleasant reading, and I am sure that no one can read it without enjoying both the style and the thoughts of the essay. Nevertheless it is not philosophy, and pretty though it is as a literary composition, it becomes warped by its philosophical claim, which is exactly the same fault which we find with Professor Boodin's master, Professor James.

In this pragmatic interpretation philosophy has given up its ambition to become a science. It has no dogmas, no doctrines, no position either to defend or to attack, and so it is tolerant. Professor Boodin claims that "philosophy like poetry and art, when it is genuine, is only the expression of the mood of a soul." Mr. Boodin wants to procure for philosophy the same variety that is possessed by art.

With reference to art and poetry Professor Boodin says, "We do not demand rigid consistency here," and he longs for plasticity in philosophy too, saying, "Why should not every sincere man express his philosophy that seems reasonable to him at the time?" We answer that he most assuredly may, but the expression of moods will be a poor contribution to philosophy as a science, in fact it would be no philosophy whatever. It would be a *soi disant* philosophy, a poetic expression of a transient *Stimmung*, a sentiment.

Far be it from me to denounce or object to poetical expressions of our moods; they are quite legitimate in the

domain of *belles lettres*. I would not even find fault with any one for calling them philosophy or philosophical effusions, but I do object to regarding them as *the* philosophy that has come to supersede all other philosophies, denying that there is a true philosophy, a philosophy as a science, or as we call it, the philosophy of science.

Pragmatism claims to be tolerant. It is tolerant of all philosophies that are merely subjective expressions of personal idiosyncrasies. Mr. Boodin asks, "Why are they not all true, in so far as they are really genuine and really express human nature, then and there?" This tolerance means that whether true or untrue in a scientific sense, they are all on one level, and according to our old-fashioned conception of truth, this is practically a declaration that all philosophies are subjective, all are castles in the air.

This attitude of pragmatism is about the same as if somebody were to declare that in the realm of science astronomy and all different astrological systems are of equal value. There are no real laws of nature; all laws of nature are mere approximations. From this standpoint the astrologer might have something to say about "the materialism" of the astronomer who assumes that the stars run their courses according to "the blind laws of nature," but one ought to be as tolerant with the astronomer as with the different astrological interpretations of the planetary movements, viz., the Babylonian system which looks upon the stars as gods, the medieval method which believed in some mysterious influence of the several planets upon the lives of men, and the modern astrologer who tries to adapt the medieval traditions to the modern conception.

If it were true, as Mr. Boodin says, that "Truth is at best experimental," there would indeed be no reason to turn our backs upon the old superstitions. It would be an indication of our intolerance. The magus of ancient

Babylon, and the astrologer of the Middle Ages, and finally the occultist of to-day, each in his way proclaims that there is some pragmatic meaning in the positions of the planets, and we ought not to say that their efforts are futile, for, says Mr. Boodin, "nothing can be more fatal than stopping the experiment."

CONCLUSION.

There is no need of prolonging the discussion. With all my admiration for Professor James I can not take kindly to his pragmatism, and must openly confess that his loose way of philosophizing does not exercise a wholesome influence on the young generation. If Professor James were right philosophy as a science would not and should not exist, for all that were left of philosophy would be subjectivism, which means an expression of our attitude towards the world. There would be as many philosophies as there are personal idiosyncrasies, and even every individual would not always remain the same but have different moods. We would all be pragmatists, and we would all exercise the utmost mutual tolerance, for we would grant the privilege to every one to regard his thoughts as true,—true to him and true at least at the time. We would draw the line only when we meet with people who have the impudence to believe in the objectivity, the permanence, the reliability of the truth, and demand consistency in all statements of truth. In other words, the sentimental and the subjective would be supreme, while an objective knowledge of truth would become a matter of indifference.

Professor James is a fascinating personality, original and interesting in his very vagaries, genial and ingenious, versatile and learned. He is not scientific in his habits of thought, he is not critical, and I have the impression that he cherishes a dislike for science. Exactness of

method seems to hamper his mind and would naturally appear to him as pedantry. He loves to indulge in the *chiaroscuro* of vague possibilities, and so he shows a hankering for the mysteries of psychic phenomena, whether due to telepathy or spirit communication, as evidenced in the case of Mrs. Piper. He would resent to have his thoughts restrained by the balance wheel of critique. He seems to enjoy being freely moved by the spirit. In a word, his temper is not scientific but that of a poet or prophet. He loves to be guided by inspiration. Being inspired, he is himself inspiring. Hence his unusual magnetism, and hence also the success of a philosophy which he has made his own.

In the philosophy of a man like William James the personal equation is the most important item, and he judges science and the scientific labors of others after his own mode of thought. He does not try to eliminate the factor of his idiosyncrasies, and so he assumes that that is the normal condition of all thinkers. This is evidenced in his book entitled *The Will to Believe*. This attitude is desirable in a poet, but not in a philosopher; it is good in *belles lettres* but not in science; and no harm would be done if his pragmatism were received simply as an artistic movement that has a purely esthetical significance but should not be taken seriously. Pragmatism comes with the pretense of being taken seriously, and it sweeps over the country with the power of a fashionable fad. It claims that now at last we have a philosophy that reconciles all the contradictory religions and philosophies, that redeems the world from the tyranny of definite doctrines, and proclaims a new view of truth, which is no longer final, rigid and stable but plastic and may suit anybody in any emergency.

Pragmatism insists upon an important truth—a truth which is so obvious that it is almost a matter of course;

but it emphasizes it so onesidedly that it overlooks a more important truth and thereby its very conception of truth becomes warped. However, in this way pragmatism acquires the semblance of originality, of something new and unheard of, while in fact it is only a modernized redaction of the ancient philosophy of the sophists and of their principle,

πάντων μέτρον ἄνθρωπος,

which also is true in a certain sense but becomes a fallacy if the onesidedness of the principle is lost sight of.

Pragmatism has appeared cometlike on our intellectual horizon. It flashed up with a sudden fluorescence like a luminous fog which through the extent of its broad sweep threatens to outshine the old stars of a steadier light. The nucleus of the comet is Professor James, brilliant but erratic; and he is attended by the tail of his many admirers and imitators, all aglow with the stir of their masterly enthusiasm, and the world stands open-eyed at the unprecedented phenomenon.

Professor James prophesies:

"The center of gravity of philosophy must therefore alter its place.....

"It will be an alteration in 'the seat of authority' that reminds one almost of the Protestant Reformation. And as, to Papal minds, Protestantism has often seemed a mere mess of anarchy and confusion, such, no doubt, will pragmatism often seem to ultra-rationalist minds in philosophy. It will seem so much sheer trash, philosophically."

We answer with Professor James who continues,

"But life wags on."

Cometlike pragmatism has appeared, and we venture to predict that cometlike it will fade again after a while.

Personally I have a decided liking for Professor James, and I am sure that in expressing it I voice the opinion of

many. I have met him repeatedly and have felt the sympathetic charm of his personality. I wish him all possible success and the honor of merited renown. I hope that for the rest of his life he will remain as buoyant and spirited as he has ever been, and will meet with unlimited recognition. But for all that I can not agree with or accept the philosophy of the great Harvard Professor, and I go so far as to look upon its wide acceptance as a symptom of the immaturity and naivété that obtains sometimes even in the professional circles of our universities.

With all due respect for Professor James, for whose extraordinary and fine personality I cherish an unbounded admiration, I must confess that I would deem it a misfortune if his philosophy would ever exercise a determining and permanent influence upon the national life of our country.

EDITOR.

HEREDITY RELATED TO MEMORY AND INSTINCT.

IT is a weakness of our scientific methods that they sometimes render us more intent upon theories of explanation than upon the recognition of facts. The instinct of causality dominates the other faculties of the mind and leads us to disregard the phenomena which we have no theories to explain.

Science has been defined as knowledge of causes, but unless the search for causes is preceded by knowledge of facts we soon wander into barren wastes of speculation. The history of philosophy warns us that the human mind is not to be trusted far from facts. After a few devious inferences our bearings are hopelessly lost. Logical consistency in the manipulation of abstract terms does not square us again with realities. As soon as we admit into our reasoning anything for which we have no familiar analogy or mental picture our conclusions also partake of the nature of abstractions. Our concrete problem becomes a metaphysical deduction, and our results have little or no value for practical application.

The literature of evolution and heredity affords many instances where zeal of explanation has outrun interest of perception and even beguiled us into greater obscurity. Answers have been announced before we knew how to frame the questions. Something has been learned regarding the external circumstances attending heredity, but we

can not yet claim to know anything regarding the ultimate mechanism, the structures and activities of the protoplasm through which the biological function of descent is accomplished. The free use of the scientific imagination has yielded only conjectures at once inadequate and improbable.

Heredity is our general name for the internal factors or agencies of descent, by which organisms are produced from other organisms in unbroken series. To call heredity a law or a principle avails us nothing; as yet it is only a word, a collective name for a group of phenomena which we do not understand. Heredity and reproduction, descent and evolution, are not separate phenomena, but mark rather the different standpoints from which we study the same processes of organic succession. Under the name heredity we seek to know the internal cellular and protoplasmic agencies which make reproduction effective for descent. The parents reproduce themselves in their offspring through the medium of heredity.

It is often supposed that heredity concerns likeness only, and that differences between offspring and parents mark failures or lapses in heredity. But if we are ever to understand heredity we must take facts as they are and not vitiate our judgment by preconceived opinions, such as the traditional idea of an agency which would make organisms alike, in exact duplications. That heredity does not do what we may have supposed, affords no reason for refusing to believe that the phenomena of heredity are concrete, and the processes truly physiological. To deny that heredity exists is merely to wipe the previous conjectures from the slate, but the problems remain to be solved. The like-from-like equation gave us no hope of a solution, for it did not represent the facts.

What we really need to understand is the making of unlike from unlike, for this is what happens in the world

of organic nature. It is this kind of heredity which we seek to bring into relations with other groups of phenomena. We would know whether there are any familiar facts or functions which heredity resembles, whether there are any analogies which enable the problems of heredity to be stated more nearly in terms of experience, instead of being viewed so completely in the abstract.

Of the nature of the material basis or mechanism of memory we know as little as of the structure of matter, but we are much better acquainted with the workings of memory. The phenomena of memory lie partly within the field of consciousness, close to the citadel of our intelligence, and afford more definite analogies with heredity than those drawn from physics and chemistry. Heredity we observe from without, but of memory we have experience from within. This experience should make us more tolerant of some of the facts of heredity—facts which we commonly fail to recognize, because we are unable to describe and explain them in the mechanical terms to which some would restrict the vocabulary of science.

PARALLELS BETWEEN HEREDITY AND MEMORY.

All are aware of the power to recall and reproduce before the mind impressions of events long passed. It is also a matter of common knowledge that impressions may be temporarily lost, beyond the control of the conscious, voluntary memory, though still retained by the subconscious memory. We know that we have met the man and heard his name, and are sure that the impression remains in the mind, though momentarily unable to reproduce its original surroundings.

Of all the multitude of impressions stored in the mind only two or three can be brought simultaneously into consciousness, for comparison or expression. To have fre-

quent occasion to recall a fact gives facility in reproducing that particular impression, but impressions may also remain unrecalled for many decades without being lost or weakened. They may come back vividly in dreams or in abnormal mental states, after years of absence from the conscious mind, or even when normal consciousness is entirely unable to recall them.

Parallel phenomena abound in the field of heredity, the organic memory of descent. The failure of an ancestral character to be expressed in a particular plant or animal is no indication that this character will not be transmitted to subsequent generations, and regain expression in some of them, even very remote.

When the crossing of two varieties of domesticated plants or animals yields something different from either, but more like the wild type of the species, we call this a reversion, a turning back on the ancestral pathway, though hundreds of generations may have intervened since the primitive character last came into visible expression. Thus Darwin found that the crossing of two white varieties of pigeons might result in blue hybrids, like wild rock pigeons. Similar results have been reported with many animals and plants. The mingling of varieties may recall characters long omitted from expression, but still preserved in transmission. Other reversions occur spontaneously, without crossing, sometimes when external conditions remain uniform, but more abundantly with change of conditions. If the diversities of the ancestral stocks are unknown to us we are led to suppose that new characters are produced in mutations and hybrids, but many of these have proved to be reversions, and the rest may be of the same nature.

CHARACTER TRANSMISSION DISTINCT FROM CHARACTER EXPRESSION.

To find that transmission is distinct from expression does not solve the problem of heredity; it only enables us to state our questions to better advantage. To be aware that our equations contain two kinds of unknown quantities, instead of one, may be quite as helpful as in algebra in determining the missing factors. Comparison of heredity with memory is useful if it enables us to distinguish better between the two kinds of facts which we have been attempting to explain by one kind of heredity.

Heredity, like memory, is a complex of two distinct groups of phenomena. Transmission inheritance corresponds to the subconscious memory, expression inheritance to the conscious memory. The subconscious, involuntary memory is the faculty which receives and retains impressions of all that passes before the senses; it is quite independent of the other process of voluntary memory, the recalling of past impressions, illuminated by the searchlight of consciousness. The catacombs of the mind are only partially wired for this voluntary illumination; of the other records we have only casual glimpses, often when we least expect them.

An event can not be remembered unless the necessary impressions have been received, but it is not the lack of impressions which so narrowly limits our field of knowledge. The impressions we receive vastly outnumber those we can recall, just as the transmitted characters greatly exceed those expressed in any individual plant or animal. The coming of a character to visible expression in an organism is a process distinct from the transmission of characters. Transmission implies only the basis of expression, the passing from one generation to another of the power to produce a certain characteristic. Whether

the possibility is realized or remains in abeyance, depends on other factors, on internal expression relations and sometimes on external conditions.

Current theories of heredity do not take into account these two distinct processes, transmission and expression. Diversity among the offspring of the same parents is now ascribed to differences of transmission; the germ-cells are not supposed to convey full complements of the parental characters, according to the theory of Mendelism.

It often happens in crosses of varieties with definitely contrasted differences that the character of one parent remains entirely in abeyance in the first generation, while the other character gains exclusive expression, but the abeyant character reappears in about one-fourth of the second generation. Mendel sought to explain the proportions of the contrasted characters in the second generation by his theory of alternative transmission by pure germ-cells. Units representing the characters of the two parents were supposed to be separately conveyed in equal numbers of the germ-cells produced by the first generation. About one-quarter of the chance matings among two kinds of pure germ-cells would result in bringing together germ-cells containing the unit of the abeyant character, and this would explain its reappearance in one-quarter of the second generation.

For mathematical purposes the doctrine of pure germ-cells leaves nothing to be desired, but the biological facts are not equally accordant. Mathematical problems are usually capable of a considerable variety of solutions, so that a simple numerical coincidence can hardly be accepted as proving the nature of Mendelism, and still less as demonstrating the existence of character-unit particles and their alternative transmission in pure germ-cells, as general principles of heredity.

Biological facts warrant a different conception of the

facts of Mendelism and other phenomena of descent. Each normally produced germ-cell can be thought of as receiving and transmitting the characters of both the parents, as well as those of more remote ancestors. Transmission inheritance may be thought of as inclusive, complete and permanent, like the subconscious memory. The assumption of character-unit particles and of their separate transmission becomes entirely unnecessary as soon as we associate the Mendelian phenomena with other well-known facts of reversion, which prove that characters can be transmitted without being brought into expression, not only for one generation or a few, but for large numbers of generations.

The facts of Mendelism do not prove that the germ-cells are pure, in the sense of being able to *transmit* only one of the contrasted characters. They indicate only that the germ-cells have different *expression relations,* half of them tending to express one character, the other half the contrasted character. Alternative expression accommodates the facts of Mendelism better than alternative transmission, for it is frequently found that the germ-cells supposed to be "pure" have in reality transmitted the contrasted character, to reappear unexpectedly in some later generation.

DIVERSITY OF CHARACTER EXPRESSION A NORMAL PHENOMENON.

Though the formal distinction between expression and transmission remained to be drawn, the facts have long been recognized in connection with sexual characters. Darwin and others have appreciated that peculiarities of the secondary characters of one sex can be inherited through the opposite sex, without being brought into expression. Sexual diversity, like Mendelism, is a phenomenon of alter-

native expression of contrasted parental characters. Diverse parents produce equally diverse offspring, and in equal numbers. Sexual diversities are usually very much greater than those of the contrasted characters of the Mendelian hybrids. Mendelism shows that alternative expression is not limited to sexual characters, but appears in connection with many kinds of differences, including those which distinguish varieties of domesticated plants and animals.

The accurate balancing of the Mendelian proportions may not be frequent in nature, for natural species commonly show more numerous alternatives of expression. They are seldom limited to the Mendelian condition of contrasted pairs of characters, but have a rich diversity of combinations of alternatives and proportions, so that no two individuals are exactly alike.

Diversity, even among the simultaneous offspring of the same parents, should not be thought of as abnormal. and does not require us to predicate diversity of heredity, in the sense of transmission. Individual diversity in the expression of characters is like that of the many eye-witnesses of an event who give widely varying accounts from memories of closely similar visual impressions. The conscious memory often supplies only dim or disconnected outlines, allowing details to be elaborated by the imagination, in accordance with interest or prejudice, or capricious associations of other ideas. Imagination may even prove stronger than direct perception, as when one substitutes words and changes constructions in reading from the printed page.

Likewise with organisms, expression seems never to coincide completely with transmission. Fluctuation of expression relations is a principle of normal descent. Members of a species are alike only in comparison with members of other species; among themselves they are end-

lessly diverse. Individuals do not show the same combinations and proportions of characters as any of their ancestors or relatives. Each represents a new selection of details from the transmitted history of the evolution of the species.

ENVIRONMENTAL ALTERNATIVES OF EXPRESSION.

There is no completely fixed individual inheritance, no absolute predetermination in the germ-cells of the characters which shall be brought into expression in adults. When germ-cells of different varieties are united in conjugation, characters may be brought into expression which neither of the partners would have shown if joined with a mate of its own kind. And long after the germ-cell stage is passed it is still possible for one pattern of construction to be substituted for another, either as a regular incident of development or through change of conditions of existence during the growth of the individual.

All the characters developed by an insect during the larval period may be thrown aside at the time of metamorphosis to bring into expression an entirely new equipment, adapting the reorganized creature to different habits of life and a different place in nature. Young junipers and eucalypts produce for several years one kind of leaves and then change suddenly to the very different foliage of the adult type. Some amphibious plants have two distinct forms of leaves which alternate with each change of habitat, from land to water or from water to land.

External conditions can influence the expression of characters in individual organisms, but need not be reckoned as agencies affecting transmission heredity. External conditions do not cause the characters of organisms. Change of weather may cause umbrellas to be substituted for parasols, but we do not say that weather makes um-

brellas and parasols, or the wit to use them. Characters are changed to adjust organisms to different environments, but such accommodations are not imposed from without, but are put forth from within. They represent alternatives of expression, brought out from large stores of transmitted ancestral diversities. Expression inheritance, like the needle of a compass, is susceptible to external influences which do not affect the dial of transmission heredity.

All the characters of organisms can be thought of as transmitted by like processes of heredity, and as having been acquired by like processes of evolution. Yet characters differ greatly in their expression relations, not only in different species and varieties, but even in the same individual, under different conditions, or at different times in its life-history.

Mutilations and direct results of environmental limitations or accidents, do not represent characters of organisms, and have nothing to do with heredity, but all characters which organisms bring normally into expression appear to be capable of transmission. Character-alternatives subject to environmental influence are not less truly characters of the species than those expressed in all individuals. Alternative characters represent a more specialized and useful form of expression inheritance, and enable the species to exist under a wider range of conditions. A plant able to change readily the size and texture of its leaves may thrive both in sun and shade, while a less versatile species may be restricted to one condition or the other.

If all alternative characters had relation to environment the theory of external causation would appear better justified, but the fact is that the sexual and other non-environmental diversities among the members of a species are often much greater than the variations they show in

accommodating themselves to external conditions. Expression inheritance is unlike the needle of the compass in having power of independent motion, without external interference. Internal expression relations have to be recognized as able to maintain alternations of characters, without reference to environmental conditions.

CHARACTER REVERSION LIKE MEMORY FATIGUE.

The conscious memory becomes fatigued through long-continued exercise on one set of impressions. The impressions are not destroyed by this fatigue, but the recalling of them becomes distasteful. An increased amount of voluntary attention is required to prevent the wandering of consciousness to other kinds of impressions. Recreative diversity of interests is a principle of psychological hygiene. A fixed idea, the persistent direction of consciousness upon one fact or group of impressions is an abnormal mental state, soon leading to still more definitely pathological conditions.

On the side of heredity, similar fatigue phenomena may be recognized. Selective narrow-breeding renders organisms more and more uniform. One set of characters is repeated in the successive generations of the selected stock, and the other alternative features left in abeyance. Uniformity in the expression of one set of characters may increase the agricultural value of the variety, but the restriction of expression to a narrow range of characters results in a weakened vitality, and a lessened rate of increase.

Limitation to one set of characters brings, in other words, an expression fatigue. Even the uniformity is seldom complete, but continues to be broken by reversions, that is, by the occasional production of individuals in which the former alternatives of expression reappear. Re-

versions are often more vigorous than the narrowly selected parental stock, and may serve to originate new agricultural varieties, especially when they "come true" from seed, as in the plant reversions now often described as mutations. Reversions become more and more abnormal as the expression fatigue increases and the natural freedom of alternatives of expression is gradually lost.

Expression fatigue also brings a gradual narrowing of the range of conditions under which the variety remains normal and uniform. With many closely selected varieties of plants seed has to be raised in one particular locality. Even a slight change in the expression of the environmental characters is likely to disturb the processes of descent and reveal their degenerate state. Sometimes the removal of selected varieties to new conditions calls forth large numbers of degenerative variations, and sometimes a notable change occurs in a whole planting, as though a simultaneous mutation of all the individuals had taken place.

The fixing of characters within too narrow limits, like the fixing of ideas, leads ultimately to the derangement of the structure, by the loss of the normal alternatives of diversity. Variety is not only the spice of life, as the adage says, but it is a necessity of normal existence, not for man alone, but for the whole organic world. Stability of characters in organisms is not normally maintained by "identity of form and structure" among the members of the species, but rather by a natural tendency to vary and alternate along a specific range of diversity. This range of normal diversity represents the true evolutionary characters of the species, rather than the peculiarities of any single individual or of some narrowly selected group.

EVOLUTION OF MEMORY THROUGH INSTINCT.

Heredity, instinct and memory represent a truly evolutionary sequence of specialization. Structural coordinations of organisms with their environments we ascribe to heredity, while coordinations of activity are called instincts, but there is no essential difference. Instinct is a part of heredity which determines functions, even after structural development is complete. Structure-building by heredity, and muscular contractions determined by instincts, depend alike on internal activities of cells.

Heredity adapts the mouths and muscles of embryonic mammals for sucking, and it also supplies the wholly unconscious new-born young with instincts to use these complex milk-extracting appliances. Instinct does for the infant what memory does for the adult. Instincts not only resemble memory, but share the same functions; they have been aptly described as the memory of accumulated ancestral experience. The memory-organs, like other parts of the body, are formed through heredity, and doubtless represent a specialization of some of the functions of primitive cells. Heredity itself is the primitive cell-function which memory most nearly resembles, and the instincts afford the connecting link between heredity and memory, indicating a developmental relation.

Though more helpless at first than the lower animals, man is able to remember and compare his experiences, and thus develops gradually an adaptive judgment more effective than the most complex of animal instincts. The individual animal acquires from experience only a slight addition to the highly-specialized instincts already supplied by heredity. Memory of individual experiences remains relatively useless among the animals because their actions are still under the almost exclusive control of the hered-

itary instincts, and are not readily accommodated to particular cases.

Instinct, like reason, is a form of intelligence, but a less adjustable form. The special senses and natural cunning of animals often exceed those of their human competitors, but man more than makes up in resourcefulness what he lacks in instinct. Perhaps there were limits to the number and complexity of instincts which germ-cells could transmit. In any event, an alternative form of intelligence was attained through the postnatal development of specialized memory functions. The unconscious memory which sufficed for the guidance of inherited instincts was eventually supplemented by the conscious memory, needed for recalling and comparing impressions in the making of reasonable inferences. In advanced civilizations conscious memory and rational inferences may completely overshadow the instincts, but criminals and victims of diseases or drugs often show the instinctive cunning of animals and savages. Conscious memory is thus traced back through unconscious memory to find its prototype in the inherited instincts.

CONSCIOUSNESS NOT A GENERAL PROPERTY.

The details of such a process as swimming may be developed by frequent repetition from a conscious memory into an unconscious, instinctive action. From such facts it has been inferred that the subconscious instincts of man and the lower animals began as conscious voluntary actions and developed gradually into unconscious hereditary instincts. Eminent biologists have argued that consciousness must be reckoned as a universal property of protoplasm, because organisms of all kinds are capable of purposeful instinctive acts.

This reasoning reverses the probable course of evolu-

tion. That conscious actions may become instinctive through repetition does not prove that consciousness was developed before instincts. It may show only that the original relations of the two phenomena are sometimes reversible. Animals with the most highly specialized instincts show no traces of the consciously adaptive intelligence required by the theory.

Consciousness is evidently a product rather than a cause, something superposed upon heredity, instinct and memory. The human personality exerts a voluntary control and coordination of activities which in all other organisms remain instinctive and largely mechanical. The wonder is not that conscious acts sometimes become unconscious, but that unconscious acts ever become conscious.

PLACE MEMORY LIKE HEREDITY OF CELL ARRANGEMENT.

Some of the most specialized forms of memory are the least conscious, such as those enabling animals to preserve their geographical relations and return to places whence they have come. Birds traverse continents and seas and return the next year to nest in the same tree. Accurate unconscious memory of time and place are also human talents. We may be able to recall only a few of the more striking objects encountered in a day's wandering in the forest, but by the unconscious record we can retrace all our steps and find the lost object or secure more specimens of the rare plant or animal. From the standpoint of consciousness such phenomena are quite as mysterious as the hereditary return of the offspring through structural wanderings, to the organic status of the parents.

To what extent place memory may be joined, like the instincts, to the hereditary memory, is not yet known. The memory function of brain-cells may represent, after all, only a specialization of the heredity functions of the germ-

cells, just as muscle cells represent a specialization of the primitive power of contraction. Our bodies are built of specialized germ-cells, in which primary reproductive functions have been replaced by accessory reproductive functions. Our genealogy as organisms is not to be traced back to the inferior types which are formed without conjugation or in the intervals between conjugations. The bodies of the higher plants and animals are conjugation products in another and more thorough sense of the words, for they are formed while conjugation still continues, by subdivision and specialization of the united germ-cells.[1]

The descent function of the germ-cells appears more complicated than the functions performed by other cells and tissues of the body, but it is a primitive and general function, rather than special or local. The new body is built up through a series of subdivisions of the conjugating germ-cells. The heredity function is not confined to the germ-cells, but is passed along down all the lines of cells till the final product, the adult body, has been built. There is no reason to suppose that the new organism is preformed in the germ-cells. Nor have we any indication that the germ-cells contain any special substances or mechanisms not to be found in other cells.

The matured body-cells of the highest organisms still have enough of the generative power in reserve to repair injuries. Among the lower animals and plants larger parts can be restored, and even complete bodies reproduced from small fragments. This power of regenerating lost members marks a primitive state, rather than an adaptive condition developed through natural selection. Adaptive specializations of cells, as among the higher organisms, tend away from regeneration. From historical and evolutionary standpoints the germ-cells do not appear more special-

[1] Cook, O. F., and Swingle, W. T., 1905. "Evolution of Cellular Structures," *Bul.* 81, Bureau of Plant Industry, U. S. Department of Agriculture.

ized than the body-cells, but less specialized. Studies of body-cells and their relations may prove quite as significant for heredity as studies of germ-cells.

SPECIALIZATIONS OF HEREDITY IN HIGHER ORGANISMS.

As we ascend in the scale of organization the cells of the body become more specialized and their power of giving rise to new sex-cells is more restricted. In the highest types the original reproductive function of most of the body-cells is lost. They have no longer a complete biological existence, since they leave no offspring of their own. Like the sterile worker bees of the hive, they function only as parts of an organization.

The fact that conscious memory is not inherited does not destroy the analogy with heredity, nor lessen the possibility of common origin. Memory and consciousness, like physical strength, are functions of the specialized cells which no longer serve for reproduction, but must develop anew in each individual, through proper nourishment and exercise. The instincts are carried along and repeated in each generation, but the record of memory is furnished only in blank. The heredity memory provides brain-cells for the personal memory, but leaves them without the ancestral equipment supplied with the instincts. The power to remember and act upon individual experiences thus appears as inversely related to the power to forget and disregard the ancestral experience; it substitutes the memory of recent impressions for instincts relating to the past.

If memories were transmitted as effectively in man as the instincts are in the lower animals, we would be in the same plight as they, for the nonadjustable instincts of the animals are often worse than useless outside the conditions in which they were developed. The memories would

not pertain to the existing conditions and would have less value as the basis of judgment than those we individually accumulate. We would be burdened with useless historical details, like the primitive peoples whose educational efforts are spent in the memorizing of genealogies, rather than in training in the arts of life.

Even the most civilized nations have yet to put behind them the superstitious notion that minds must all be subjected to some particular system of training, or that there is some particular body of knowledge with which all brains must be stocked. Our young people no longer memorize genealogies, but most of their educational activities are applied in directions as little related to the life of the community. In the world of ideas we still waste much in efforts to preserve useless relics of the past, like the savages who have not learned the art of burial, but drag their dead about with them, to the detriment of the living.

CONSCIOUSNESS AND EVOLUTION.

Man is by no means so deficient in instincts as our conceit often leads us to claim. Instincts are the background of consciousness. Pleasure can be defined biologically as the satisfying of instincts, and vice as the perversion or unbalancing of instincts, by which they cease to serve their natural purpose in the economy of life, or become unduly developed, to the detriment of other tendencies and functions.

The highest power of the personal will is to choose among the instincts, to determine which are to be served and developed, which to be avoided, deferred or suppressed. Judgment is weaker and more fallible than instincts, but when instincts are in conflict judgment can call them into court to compromise their differences, instead of surrendering the interests of all to the blind slavery of a single

usurper, whether in the form of superstitious fear, or of some more obviously physical gratification. Animals, children and savages often enjoy being frightened. Fear is a normal and useful instinct which seeks occasional exercise, but interferes with evolution if too much indulged.

Instincts of the utmost utility to savages may become useless or even harmful for civilized man, and tend toward elimination. Other instincts of small significance in barbarism are being developed with the better opportunities afforded by civilization, such as the instinct of causality, the basis of scientific investigation. Right proportions among the instincts are quite as important as in the physical body, if the organism is to accomplish its normal functions. Heredity bears upon human welfare through the instincts even more than through the bodily features, for the range of variation in instincts is far wider, and they are equally heritable.

As the lower forms of memory serve only for the recognition of something actually present, so the lower forms of instincts and of consciousness deal with facts only from the standpoint of the narrow selfishness of the individual. Finally, a higher stage of personality is reached, and the range of interest gradually widens to include all human relations. Evolution passes to the conscious plane. We seek to know the good and evil of existence, to avoid its limitations and to realize its possibilities.

In more complete consciousness lies the only security of human progress. We must appreciate our human birthright, and open the eyes of our understanding upon the problems of our own existence. Thus far human institutions and societies have developed by the same unconscious evolution as plants and animals, and with the same high percentage of fatalities from over-specialization in wrong directions, economic, social, educational and religious. It is not sufficient that sages and reformers shall frame sys-

tems good for their own ages and generations, and establish them by arbitrary regulations. The spirit of true progress seeks to assure its steps in the light of full, scientific knowledge. Virtues of one age may become vices of another, if they set limits to evolution.

It is this larger consciousness that now gives a practical value and a pressing importance to the study of evolution. The motive is no longer a mere curiosity to know whence we have come or whither we are tending, but the realization that acts may determine the fate of tendencies, not only for individuals, but for nations and races. Consciously or unconsciously, evolution is a process of choice. We have now reached the stage of development in which the choice can be made conscious.

With every advance in the scale of development the problems of existence are vastly multiplied, and the chances of further progress decrease. The mere multiplication of species or elaboration of local differences, such as those distinguishing tribes of Indians and other primitive peoples, may signify little in evolution. Thousands of species and tribes are sacrificed and extinguished for one that develops a new talent and attains a higher stage of existence.

Of all the millions of species that have inhabited our earth only one remained on the path that led to the attainment of consciousness, the rational appreciation of the purposes of our acts. Of all the millions of men who participated in the ancient Oriental and Mediterranean civilizations only one effectively perceived the more fundamental laws of human personality, and opened the way toward possibilities of higher development—possibilities we have scarcely begun to realize, after nearly two thousand years.

ASSOCIATION IN HEREDITY AND IN MEMORY.

A final analogy between heredity and memory is found in the fact that both are phenomena of association. As the mind grows by the accumulation and combination of ideas, so does evolutionary progress toward higher types of structure depend upon the maintenance of a network of interbreeding which binds the members of a species into a social and physiological unity.

Multiplicity of alternative characters strengthens heredity, just as the association of many impressions renders memory more effective. The more we know about anything the easier it is to acquire additional details. The more numerous the characters transmitted, the greater the efficiency of the hereditary processes, even though many of the characters remain unexpressed. As bicycles and gyroscopes require to be in motion in order to maintain their equilibrium, so organic stability depends on change. The existence of a species is not maintained by uniformity, but is supported by diversity, by free alternations between many characters. This enables us to understand the otherwise useless diversities found everywhere in nature. A very large proportion of the characters by which related organisms differ have no environmental or other value, unless it be this physiological benefit of multiplying diversities.

The heredity function degenerates with narrow breeding, just as the memory becomes enfeebled if associative contacts cease. A species is an organization of plants or animals, just as the intellect is an organization of remembered impressions. Evolution is a progressive improvement of the descent-fabric of a species. The causes of evolution are not in the environment, nor in the individual organisms, but in the species. A synthetic, constructive

process goes on in heredity no less than in the associative intellect.

The combination of characters derived from different lines of descent contributes to the progress of heredity, but no amount of mere combining of primitive characters would fully explain the continued advancement of organisms in series of new types. New characters arise and new functions develop by progressive modifications, just as the mind attains new ideas and standpoints, significant for intellectual and social progress.

That evolutionary constructions are unconscious is no evidence against their reality. The most effective synthesis of mental impressions also takes place unconsciously. We return to a task which has received no conscious attention for days or weeks, to find that new and vivid associations have been formed, or that a more orderly arrangement of ideas is ready for expression. We can not voluntarily imagine anything new; otherwise there would be no delay in scientific discoveries. New ideas, like other new characters, are reached by unconscious evolutions and associations, coming as accidents and surprises, even to the deliberate investigator. Originality is the power to recognize the truth of these unconsciously formed associations, even when they diverge from current opinions. The principal element in originality is lively interest in the facts, quite apart from any question of novelty.

The claim of psychologists that thought is impossible without words overlooks a distinction like that between transmission and expression. Words we must have to express our thoughts, but the essence of practical and scientific thinking is the comparison of impressions, and this is continually going on in the mind, without words and without volition. Formal metaphysical thinking can not be done without words, any more than chess can be played without a chess-board before the mind. The game of

metaphysics is to arrange abstract terms with logical consistency. Each player lays out his own problems and solves them for his own satisfaction. Schools teach this word-wrought metaphysical thinking, but it is not the only kind, nor the most effective.

Words and forms of speech also represent unconscious evolutions. Philologists assume that languages must have been deliberately contrived because much conscious ingenuity is needed in describing and comparing the endless complexities of linguistic forms and structures. Among primitive peoples it becomes evident that speech grows quite as unconsciously as plants or animals. Its development depends as little upon formal grammar as organic evolution upon botany and zoology. Instead of consciousness being the cause of language, articulate speech was one of the potent factors in the evolution of consciousness. Language and consciousness are evolutions of memory. They are characters which each individual acquires anew from its environment, by the aid of hereditary organs and instincts.[2]

Words are symbols by which ideas are expressed, but it would be a mistake to say that ideas are composed of words, or that languages originate from words. In order to serve the purposes of expression words have to stand in relations with other words. In naturally developing languages words always come from the modification or combination of older words, just as characters come from other characters, gradually changed and compounded, but not added as new units, like bricks to a house.

It is equally misleading to say that organisms are composed of characters, or to suppose that characters have any existence apart from the organisms, or that they constitute distinct entities inside of organisms. Characters have significance only in their relations to other characters.

[2] Cook, O. F., 1904. "The Biological Evolution of Language." *The Monist*, XIV, 481.

Words determine the meanings of sentences, but at the same time sentences determine the meanings of words.

Species precede and give rise to characters, just as ideas and languages generate new words. After being developed and brought into use, words and ideas are capable of ready recall and repetition. Likewise, the alternative characters of a species can return abruptly into expression, but this does not prove that either characters or species are suddenly evolved. Only the formal species or concepts defined in systematic monographs can be said to consist of characters. The physiological and evolutionary species is made up of organisms related to each other in a gradually changing network of descent.

CONCLUDING SUMMARY.

All the forms of memory, instinct and heredity, represent, we may believe, the workings of organic mechanisms, though we know nothing of the nature of such mechanisms. It has not been determined whether they pervade all the protoplasm of the cells or are confined and specialized in particular parts or particles in the cells. It is likewise uncertain whether they are formed of solids or liquids, solutions, enzymes, or other colloids. They may also depend upon electrical or radiant conditions of matter, or upon other states or properties with which we are still unacquainted.

Of the nature of heredity, as a substance or mechanism for the predetermination of characters, we gain no suspicion. We are free to use any comparison or apply any analogy that helps to illustrate or associate the facts. We have learned that the phenomena of heredity are not all of the same kind, but fall into two groups, like those of memory. There is a more comprehensive and permanent transmission heredity, independent of the expression in-

heritance of successive generations. Characters can be transmitted without expression, just as sense-impressions can be retained in the mind without being registered or recalled by the conscious memory.

Transmission inheritance is not limited to the characteristics of one individual any more than memory is restricted to the small group of impressions which can be called before the mind at one time. Uniformity of transmission does not interfere with diversity of expression. As memory may preserve the whole experience of the individual, so heredity may cover the whole evolution of the species.

The details of structure, arrangement and coordination of all the cells of the body, and of their countless variations, are transmitted by a single microscopic germ-cell. so infinitely compact is this capacious mechanism of descent, of whose nature our clumsy imaginations fail to frame any conception.

Facts are not limited by our power to understand them; it is our understanding which remains limited if we fail to recognize the facts. Theories of heredity which lead us to neglect ascertained facts of descent are worse than useless. We do not yet know what heredity is, but we should not refuse to perceive what heredity does, nor neglect to associate it in our minds with other familiar facts. Memory and instinct present phenomena of like complexity, and are related to heredity in evolutionary sequence.

O. F. Cook.

Washington, D. C.

THE THIRD MOVEMENT OF THE EARTH.

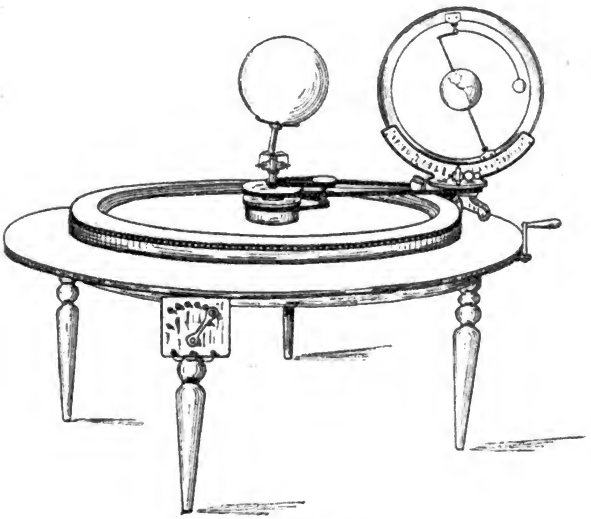
[During the World's Fair at St. Louis the Editor of *The Monist* renewed acquaintance with a French professor, M. C. A. Guerard, who at that time was in charge of a planetarium that had been built for the special purpose of exhibiting a working instance of a condition in our planetary movements, which the discoverer, M. P. Beziau, calls "the third movement." An inspection of the "Demonstrator," as M. Beziau calls his planetarium, showed that this third movement is a truth demonstrable through the facts of planetary rotations which will at the same time easily explain the retrograde movement of some of our planets. It is strange that this third movement has not found the recognition which it appears to deserve.

Upon further inquiry the Editor made the acquaintance of M. Beziau himself who is a man of peculiar talents. He is not a professional astronomer, but an able mechanician who has devised his Demonstrator all by himself and has constructed the machinery so as to exhibit this third movement, which is of great importance in our explanation of the several planetary ecliptics, and will enable us to predict the fate of our world in coming millenniums.

M. Beziau's theory has been discussed in astronomical circles of France, and M. Flammarion has spoken of it in high terms and given it a good recommendation. If it has not been noticed in broader circles it is probably due to the fact that M. Beziau is not a specialist in astronomy and that at the same time he possesses a streak of mysticism which makes him in many respects uncritical. In a personal interview with the Editor for instance, M. Beziau expressed a belief that the ancient Hindus, Egyptians, and Assyrians possessed a knowledge of this law which later became obscured through centuries of ignorance. This theory he founds on the evidences of mystical reconstructions of ancient history, the authority of which he seemed to accept without criticism. But while M. Beziau is apparently onesided, our confidence in his theory has not been shaken, and we believe that it deserves the attention of the world. Accordingly, we have taken pains to procure a sufficiently detailed and accurate statement of it, presented in his own words. It has been translated by Miss Lydia G. Robinson from the report of an interview made by M. Léon Maillard for the *Revue Illustrée*, and we submit it here for those competent to judge of the merits of M. Beziau's hypothesis.—Ed.]

THE Demonstrator consists of a glass globe representing the sun, which stands isolated in the center of a table; a car supporting a hollow metal circle crossed by

an axis passing through the smaller globe at its center which represents the earth; and at the end of the axis is fastened a stem parallel to the circumference of the circle and bearing at its end the small moon which is to play its part as satellite to the earth. The motion is controlled by a chain and the power may be furnished by electricity or by hand. There is a crank by means of which the apparatus



THE DEMONSTRATOR.

may be set in motion in whatever direction and at what ever angle is desired.

If we make the apparatus move continuously and confine ourselves especially to examining the different positions of the earth, a part of the mysteries which sleep in the depths of the geological ages will be unveiled before us

with the same facility that some celestial mysteries will be disclosed.

Let us place the axis of daily rotation at the actual angle of inclination of the earth, 23° 27′. It is now in the act of straightening itself into the vertical position. What will be the consequences of this straightening, for the various latitudes? At the equator the sun will deviate less and less from the equatorial line which it will not leave again while the axis is perpendicular. For this latitude this will be the period of excessive heat.

On the other hand the two poles will become cold as a consequence of this straightening. They will pass through the most rigorous glacial period when the axis is perpendicular. In fact the poles will not see the sun again. The ice cap will be of considerable extent. It will form a powerful condensor where the vapors of the torrid zone will be solidified. The glaciers will descend from the poles, approaching each other as they have already done to about 60°.

When the axis is perpendicular what will the temperature be at 45°? It will be the same all the year around, mild in the plains without rising, and low in the mountains. The evaporation being very great, the glaciers will descend from the mountain peaks. They will invade the plateaus to the extreme limits that they have formerly occupied. This will be the period of the most universal glacial extension.

If the axis continues its motion, the angle of inclination will change. The glaciers will draw back from the poles and the mountains and be reduced to their present extent when the axis will again have reached the position of 23° 27′, but it will continue farther in its movement, and the glaciers will continue to withdraw.

When the inclination reaches an angle of 45° there will cease to be any remnant of the ice age upon the earth.

The poles will be entirely freed, the winters will be dry and the summers warm. At the poles a day will be three months long, and will be followed by a night of the same length. This will be the period in which the existence of life will be developed most generally over the entire surface of the earth. The poles will again be covered with luxuriant vegetation.

Continuing its motion, the axis will later assume a horizontal position. What will be the effect of this position upon the temperature at different latitudes? Each year the equator will see two long winters and two very short summers. For this latitude it will be the period of the greatest glacial extension. The glaciers will descend from the mountains. The lowest part of Africa and Asia which is to-day covered with sand will be covered with water. The poles at this time will experience a very exceptional temperature. Each will have an alternate day and night of six months. We can have no idea of the degree of temperature which the atmosphere can attain during this day of six months, when the sun's rays will be directed vertically upon the ground. It is by this high temperature that I explain the excessive expansion of the soil by which Norwegian lands have been raised 150 meters and those of Canada 300 meters above sea-level.

Another geological mystery is explained by this horizontal position of the axis of diurnal rotation. (It is only this axis that we shall discuss. It serves us as a point of reference.) Geologists have ascertained that our rivers in the distant past contained twenty times as much water as they do to-day; they have even proved several periods of extensive water courses. These periods have taken place when the axis occupied the horizontal position.

During the long night which covers one of the hemispheres while the other is bathed in solar rays the vapors become condensed and snow accumulates in large quanti-

ties. But all the snow melts at about the same time when the sun rises to the horizon, and the result is an extraordinary inundation occurring alternately in the two hemispheres.

But let the axis still continue its motion and for the second time it will begin to occupy all the several positions which we have observed. In the time of a complete rotation it passes through two horizontal periods and two vertical periods.

We have noticed that the periods of great glacial extension at the poles were simultaneous with each other, but not with the equator. For a long time men have sought in vain the explanation of the discoveries made by explorers in the polar regions. This explanation will now be disclosed very naturally.

We have seen that the poles pass successively through the glacial and estival periods. Is it then surprising that vestiges of vegetation have been found at the poles under the ice that exists there to-day, and the relics of mammoths and fossils under the vegetable mold? The sudden disappearance of the mammoth in Siberia may be explained very simply. It was not at a very remote age, the date can be fixed at about fifty thousand years ago.

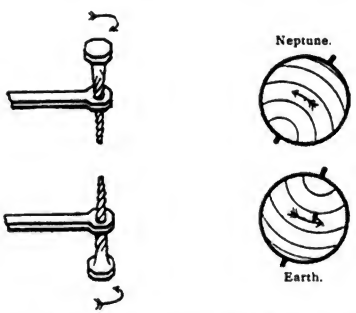
You are familiar with the fact that the earth turns upon its axis in twenty-four hours, the axis being inclined at an angle of 23° 27′ with reference to the perpendicular to its path of rotation around the sun. Every one is familiar with this rotation. It was the subject of much discussion in former days, but since the time of Copernicus and Galilei it is no longer disputed.

But there is another rotation of the earth which although well known seems to have been forgotten. This is the annual rotation.

You know that in industrial mechanics it is necessary at the risk of serious error to refer each movement in

rotary movements not to its particular center but to the absolute center of the collection of movements. The same law governs the movements of the celestial bodies. It is by imagining oneself in the center of the sun that the rotation of the moon was discovered. If we will observe the earth from this central point we will notice that it presents successively all the points of its surface to the sun. In order to do this it is necessary that it turn upon itself. A simple experiment will determine the direction of this rotary movement which is distinct from the daily movement and its angular velocity of rotation.

Take in your hand a globe to represent the earth. Direct the axis of diurnal rotation towards any point in



The planets change the direction of their rotation when their axes are reversed, as is the case with screws.

space. Stretch out your arm and turn slowly around supposing yourself to occupy the place of the sun. The globe will change its position but with it also will be changed the direction of its axis of daily rotation. Evidently this is not the way in which the earth turns around the sun, but you will succeed in imitating the exact movement of the earth if you will communicate a rotary movement to the bottom of the globe by the aid of your free hand. The

base of the globe will turn in your hand. The movement that you will have impelled is a retrograde movement, and its velocity is proportionate to your own rotary motion. When you will have accomplished a complete rotation you will have caused the globe to complete a rotation about itself in the opposite direction from its own rotary movement.

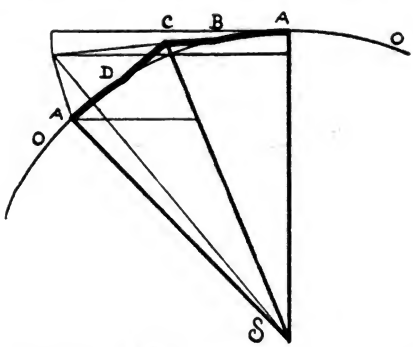
Hence the earth rotates upon itself in the opposite direction from its change of position in space during the time that it makes a rotation around the sun. This retrograde rotation is annual. It takes place around an axis which is ideal or potential in space, and perpendicular to the plane of its orbit. This axis has no fixed point in the interior of the earth. Its rotation is common to all the planets, wherefore we can formulate the following law:

The planets turn about themselves on an ideal axis perpendicular to the plane of their orbit in an opposite direction from their movement around the sun and in a time equal to that of their revolution.

From this movement which is of a purely mechanical nature and can be demonstrated geometrically, it results that the earth is a free body around its own center of gravity and that solar action can be felt upon it only by this center of gravity. Knowing the resistance offered by bodies in rotation when compelled to change the direction of their axes, it might be thought that this rotation is the result of the diurnal rotation, but it is not confined to the earth. The lunar orbit and consequently the moon itself are affected by this same rotation, and in analyzing the movements of the system composed of the earth and moon, we see that this annual rotation could take place even if the diurnal rotation were stopped. Its cause lies only in the liberty with which the earth plays around its center of gravity, on which the central forces act. It is the natural

consequence of the movement of the system around the sun.

This study leads us to interesting statements regarding central forces. Newton said that if the central forces were equal they would destroy celestial movements, and if they were unequal they would produce chaos. He seems to have stated a dilemma from which there can be no escape.



S, sun; O, planetary orbit.

In passing from A to B the planet describes an arc which produces centrifugal force. This overcomes gravity and drives the planet along the tangent C. The centrifugal force ceasing here, gravity acts again and brings back the planet over the arc DA where the centrifugal force again originates and the same effects are repeated.

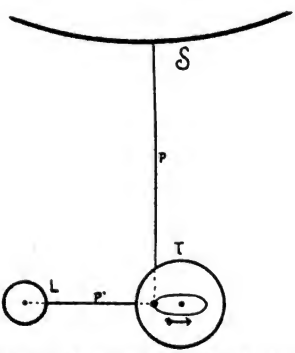
The recognition of this rotation and the analysis of the celestial movements give the key of this mystery, and the following law which is easily verified may be formulated:

Central forces act upon each other alternately in infinitely short lengths of time at the point where they are in equilibrium.

In reality the central forces never cease acting upon each other but their work is alternately effective. It is this alternative work which assures regularity and indefinite duration to the movements of celestial bodies.

Accordingly we recognize two rotations of the earth. Let us try to find the third, but before leaving the retrograde rotation, it is well to consider its motion with relation to the earth-moon system.

This rotation is effected by both bodies turning together around the same pivot. Now the conditions of equilibrium require that this pivot should be placed not in the center of the earth but in the center of gravity common to both bodies. This center of gravity lies about 1700 kilom. from the surface of the earth and 4600 kilom. from its center. But as a result of the change of position of the moon this



S, sun; T, earth (*Terre*); L, moon (*Lune*); P, P', the force of gravity (*pesanteur*).

The movement of the common center of gravity of the earth-moon system causes the principal irregularities in the movements of the heavenly bodies.

common pivot is in perpetual motion around the center of the earth, or to be more precise, the center of gravity of the earth is in perpetual rotation around the common center of gravity upon which act the central forces.

The movements of the two bodies around their common pivot are very complex. It is these which have caused the principal irregularities. Indeed these alone are the cause of the precession, the retrogression of the nodes of the

moon, the nutation, the oscillation of the lunar orbit, libration etc.

This hypothesis invalidates the theory of d'Alembert on the subject of the precession of the equinoxes which he attributes to the action of the sun on the swelling of the meniscus of the earth. Any number of objections to the theory of d'Alembert may be adduced, but the most important is that this theory contradicts Newton's law. It must be abandoned because it is false in that it makes the central forces act otherwise than on the centers of bodies.

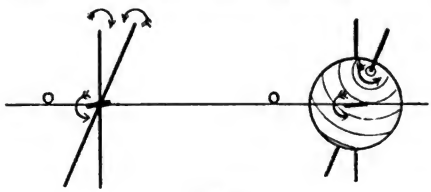
The movement of precession is caused by the alternative action of central forces upon the common center of gravity of the earth-moon system. It is the logical consequence of their equilibrium around this pivot. The central forces acting constantly in the interior of the earth upon an eccentric instead of acting upon its center of volume, have a tendency to displace the direction of the axis of diurnal rotation.

The meniscus of the earth has no more to do with the movement of precession than has the diurnal rotation. The movement of precession is an irregularity in the annual retrograde rotation. Accordingly we are already familiar with the fact that the earth has two axes of rotation about itself, but we know that a body moving freely around its own center of gravity can turn around three axes.

If we compare the earth to an ordinary body in motion we can determine geometrically with the greatest exactness the position of the third axis, since we know the positions of the two first. Only one position is possible for it.

We see that this axis must be in the plane of the orbit from which it can never deviate. Its equator must have in its plane the two poles of the axis of diurnal rotation that we call the poles of the earth. In this way a movement of the earth around the third axis must determine

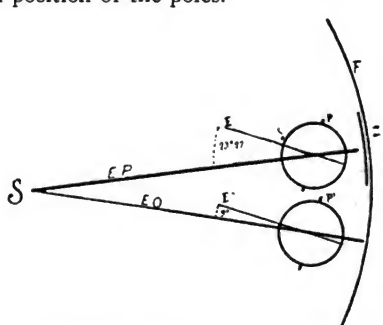
a latitudinal change of place of the two poles of the earth. An astronomical movement observed for more than four thousand years and known under the name of the "diminu-



O, orbit.

Geometrical position of the three axes and the direction of the angular rotations.

tion of the obliquity of the ecliptic," has been plausibly attributed to the equator. Its effect has been to change the latitudinal position of the poles.



MOVEMENT KNOWN AS DIMINUTION OF OBLIQUITY.

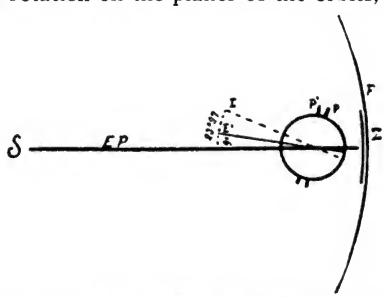
Wrongly attributed to the earth's orbit.

The obliquity at present is 23° 27′. As it decreases, the earth and its orbit would have to vary from the general law of the planets and would move from EP towards EO, which is impossible.

This movement had been attributed to the ecliptic since its discovery without profound investigation, and on this hypothesis Laplace and Leverrier have rightly limited its

extent. They have not considered the hypothesis in which the movement would belong to the equator. In that case they would be able to limit neither its extent nor duration.

We know that the first two rotations are common to all the planets. All the planets indeed, like the earth, have their diurnal rotation and their annual and retrograde rotation, though with different angular velocities. These have been established by observation. The third rotation must be observed like the others in the other planets. As its effect is to modify the angle of inclination of the axes of diurnal rotation on the planes of the orbits, these axes

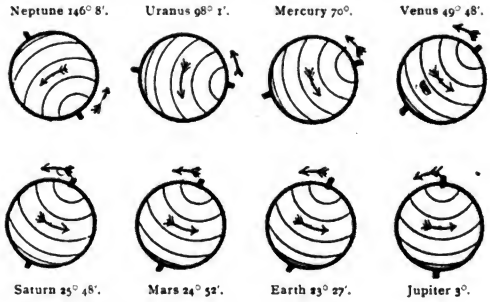


DIMINUTION OF OBLIQUITY.

If this movement is attributed to the earth itself instead of to its orbit, there is no need to vary from the general law of the planets, and the axis need move only from P to P' to produce a diminution equal to that of the preceding figure.

must be taken at any time in their rotation and in the greatest variety of angles of inclination. This indeed is what we have acquired through observation. Jupiter's axis is inclined at only 3°, Mars at 24° 52′, Saturn at 25° 48′, Venus at 49° 48′, Mercury at 70°, Uranus at 98° 1′, and Neptune at 146° 8′, but we know that the satellites share all the movements of the planets, and we know in mechanics that if a rotary movement of a pole takes place from left to right, the same movement from the opposite pole takes place from right to left.

Again we know that the satellites of Uranus and Neptune have a retrograde movement. Now if we observe the large angle of inclination of the axes of rotation of Uranus and Neptune we will notice that these planets appear to us in the same position in which the earth would be if its south pole occupied the place of its north pole in its projection in the midst of the stars. In this position the moon would appear to the inhabitants of Mars, for instance, to turn in the retrograde direction. This change of rotation which has so greatly perplexed the astronomers would accordingly be most natural. It is the logical conse-



LATITUDINAL MOVEMENT OF THE AXES.
Shown by the different positions of the planets.

quence of a complete latitudinal rotation of the planets, bearing their satellites with them.

These three known rotations moreover can establish the definition of our globe as follows:

The earth is a spheroid of revolution, slightly oblate, moving freely around its center of gravity, circulating in space around the sun and turning upon itself simultaneously with different angular velocities around three axes of rotation.

We know the angular velocity of these three rotations:

the first and most rapid takes place in twenty-four hours; the second, less rapid, takes place in a year; the third is extremely slow and observations unite in assigning to it a velocity of 48″ a century. Its rotation therefore would be accomplished in about 2,700,000 years.

This rotation can never be observed either in the heavens or on earth except by the traces which it may leave and by the observations which we will hand down to our descendants, but it can be easily demonstrated by the laws of mechanics, that the observed movement can have no other cause.

After having found the effects of this third rotation in the different angles of inclination of the planets and in the opposite rotations of the satellites it remains to discover evidence of it upon the earth itself, and this is found in gradual variation of climate.

Then, too, I can not help admiring the admirable order of Nature in which all her wonders seem to form such a marvelous whole. Has she not combined perfect movements with the ideal form of heavenly bodies? A sphere is the most simple, the natural form. No other shape can better hold together the constituent molecules in a state of stability according to the universal law of gravitation. No form could leave a body its absolute liberty around its center of gravity better than the spherical form. But if the spherical form is the ideal form of homogeneity and stability it lends itself but poorly to a regular distribution of the caloric and luminous rays of the sun on its entire surface. Although a small part receives vertical rays most of its great surface receives the rays from an oblique direction and half of the entire surface is completely deprived of them. What means, then, has nature taken to distribute light and heat upon all the surface of the spherical body? By making it revolve around itself.

But if it turned around only one axis it would still

have large surfaces at the extremities of that axis which would never receive the light. If it turned around only two axes, which might moreover injure its stability, the distribution of light would still be incomplete, but it turns around three axes, that is to say in all directions at one time.

The earth needs light and heat as much as vegetables and animals, but since its form does not permit all portions of it to be heated at one time it presents them one after another to the life-giving sun.

To sum up the three rotations: the first rotation (diurnal and nocturnal); the second rotation, of which the movement known under the name of the precession of equinoxes is an irregularity (annual and retrograde); the third rotation (secular) is incorrectly attributed to an oscillation of the earth's orbit when in reality it is the result of the movement of the earth about itself.

P. BEZIAU.

PARIS, FRANCE.

WARM EPOCHS AND GLACIAL EPOCHS.*

THE present epoch which has already endured a vast number of centuries was preceded by a glacial epoch whose length was also very great but this glacial epoch itself was preceded by a warm period, this last by another cold period, etc., etc. It has been proved that cold periods have continuously alternated with warm ones in the past.

Investigations in the cave of the Cliffs of Grimaldi made under the direction of the Prince of Monaco by the Canon of Villeneuve, M. Lorenzi, have brought to light the skeletons of men and animals, rudimentary instruments and other objects, dating from the warm period which preceded the glacial era. This warm epoch was characterized by animals that were not clothed in furs, as were later the mammoths and the woolly rhinoceros. Europe was inhabited at this time by the primitive elephant, hippopotamus, rhinoceros without the dermal folds, etc.

The human skeleton found in the Grotto of Grimaldi belongs to an inferior race. The dentition of these skeletons is almost identical with that of the native Australians of our day.

We must not conclude from the discoveries that mankind in this distant epoch was represented only by the race to which these skeletons belong. We know that the most diverse races may have lived at that time just as is the case in our own day. The important fact of this discovery

* Translated from the French manuscript by Lydia Gillingham Robinson.

is not in the anatomy of the skeleton, but in the fact of their presence in the midst of the relics of animals which characterize an epoch preceding the glacial era.

We have known of the existence of this pre-glacial man by his instruments of silica which have been found in abundance, but this is the first time that the discovery of the man himself has been pointed out. It has thus been demonstrated that man has lived at least during two great periods, glacial and estival, which have preceded our present era. It is probable that traces of his presence will be found in epochs still more remote, but the recent discoveries bring under discussion the glacial and estival periods whose existance and long duration are unanimously recognized to-day.

The cosmical causes of these great alternating periods are of interest in that since they give the explanation of past phenomena they will permit us to pursue further phenomena, and we may prophesy that these periods will be reproduced in the future just as they have been produced in the past. These great alternating periods are occasioned by a rotary movement of the earth about itself with reference to latitude. This extremely slow rotation produces an adjustment (with relation to the perpendicular to the orbit) of the poles around which the daily rotation of the earth takes place.

This constitutes the third rotation of the earth around its own center of gravity. We know that the first rotation (diurnial) produces the alternations of day and night, the second rotation (annual) produces the seasons of each year, the third rotation which is slowest of all is also the most important.

It produces seasons which extend through thousands of centuries and whose intensity is in no sense comparable to that with which we are familiar. Its movement takes place at the rate of 46″ a century; a complete rotation is

accomplished in 2,800,000 years in which interval two great glacial periods alternate with two great estival periods. This measurement of time permits us to determine the precise duration of glacial periods which heretofore has been made the subject of much controversy. If we assume an intermediate season of equal length between the great cosmical seasons, as is the case with our annual seasons, we see that each of these periods has a duration of 350,000 years, and that the making of each of these must be felt on the surface of the earth during 200,000 years at least. The slow roation of the earth with reference to latitude is known under the name of "diminution of the obliquity of the ecliptic." It has been thought that this movement is vibratory, but astronomical discoveries have shown that it is continuous and that the earth turning around its three axes following geometrical laws may be represented by a body freely movable in space.

This rotation explains all the geological phenomena which until now have remained shrouded in mystery. It also explains the great migrations of mankind, the commingling of races, etc. It throws a bright light upon the history of our planet, and permits us to determine numerically the different periods which have affected its surface.

PIERRE BEZIAU.

PARIS, FRANCE.

HINTS FOR THE ELUCIDATION OF MR. PEIRCE'S LOGICAL WORK.

[Charles S. Peirce has undertaken the regeneration of logic, a field that has been cultivated by only a few men, such as Boole in England and Schroeder in Germany. It is a work which entails a great deal of abstruse thinking, so that any article which would be a contribution to this line of inquiry would to the average reader be naturally difficult to understand, if not inaccessible. In order to enable our readers to see the significance of Mr. Peirce's investigation, the Editor has asked Mr. Francis C. Russell of Chicago to give Mr. Peirce's article a careful perusal and to provide our readers with a popular digest of it so as to point out the aim and course of Mr. Peirce's thought. We hope that this article on "The Amazing Mazes" of Mr. Peirce will prove helpful to the readers of *The Monist*. —Ed.]

THE card curiosities described in the April number of *The Monist* demand attention only for the sake of the remark that they present in a concrete way comparatively trivial particular instances of the operation of the principles exhibited in the instalment contained in this issue. But it must not be supposed that the card curiosities have been offered to cater to "popular" interest.

It is one of the cardinal points of the method championed by Mr. Peirce that in so far as the same is possibly attainable, reasoning, indeed all serious thought, should be *iconized* (the word is mine but the idea is his); that is to say, that the idea dealt with should so far as is possible be represented by a sign or sign-complex, fit by its constitution to display in detail to the intellect all the essential features of the said idea, and especially all the various interrelations that subsist between the constituent elements thereof; in other words, that the plan, so to speak,

of the said idea should be as concretely expressed as possible. To this very end Mr. Peirce has invented two schemes of logical algebra and two systems of logical graphs. Now in the present case the cards used in the card tricks fulfil an iconic office. They fulfil it in some respects in a superior way. They are not only concrete but are also corporeal.

The first third of the exposition contained in the present number is a purely mathematical account of the phenomena presented in the manipulation of the cards pursuant to the rules stated therefor, and of the reasons why the said phenomena must be so presented. If the article contained nothing different in kind than this, while it would be a paper highly interesting to mathematical experts it would nevertheless not be a paper suitable for such a magazine as *The Monist*. The sum and substance of the whole mathematical discussion stated in a summary way, is that a sufficient number of repeated dealings of a pack or packet of cards (whose order is known to begin with) into a constant number of piles according to the rules given therefor, together with repeated regatherings after each deal in the proper order of starting and following, brings round the identical known order in which the pack or packet was arranged at first.

Those who are antipathetic towards mathematics may skim over, or, if they must, may skip altogether this mathematical third of the article without serious disability for the comprehension of the rest which is really the specially important text of the article. (It begins at page 432.) The mathematical discussion involves recourse to that highly recondite region called "The Theory of Numbers" and especially to "Cyclic Arithmetic," a sub-region thereof. "Cyclic arithmetic" involves a subsidiary cyclic number system, viz., the "cyclic logarithms."

Now in these regions of mathematical exploration the

explorer has one and only one master key, to wit: that operation that ought to be called "Fermatian Inference" (since it was Fermat that first brought it to light) but which is often called "mathematical induction" (a ridiculous appellation) and more often "the inference from n to $n + 1$." It is plain that it must be a logical transition, and it is so analogous to the *dictum de omne*, the "chain of causation," etc., that the generalizing mind sees that there must be a single principle of some kind upon which all such mental transitions are founded and by which they are justified.

Now obedient to the generalizer's prompting, Mr. Peirce has in this article proceeded just about as though he had put to himself a certain *all important* logical problem; a problem that may be stated thus:

What is the nature and what are the leading characteristics of that relation in virtue of which whatever is true of its relate term is true also of its correlate term?

In other words, what is the pure essence of the copular relation, what immediate consequences does it entail, and *how* are the same so entailed?

Dr. Carus has somewhere called special attention to a very important and pregnant logical point that has been neglected. It is this.

Every problem, every question, implies assertion of some kind or other. Often it implies a good deal of assertion. Such implicit assertions have their logical consequences just as do all other propositions. Now the mere formulation of the problem above stated supposes and virtually asserts that there may be, perhaps, a relation of the kind described. So Mr. Peirce says (in effect): Put A as the name of that as yet unknown relation. This is altogether the same step as is taken in algebraic calculation when x is put to signify the unknown quantity. So again if there be such a relation there must be objects so related.

But as yet it is wholly unknown what these objects are and how many they are. So M is put to stand for *any* one of these objects, be they many or few or even only one single one. So again these objects being, at least, somewhat formulated by the relation A, must form some kind of a system, although it may turn out to be a system of only one member. So K is put to stand for the said system.

Now all that the formulation of the problem tells us about the relation A is that it is such a relation that whatever is true of its relate term is true also of its correlate term. So P is put to stand for *any* predicate whatsoever.

Now it must be well understood and always in mind that when any two objects, say M and *m* are in relation there is always not merely *one* relation but *two*, viz., the relation of M to *m* and the relation of *m* to M. We have a vicious habit of thinking a relation as a betweenness and as single. It is often the case that the relation of M to *m* is of the same kind as that of *m* to M, convertible as it is called, but there are two relations nevertheless, viz., the direct relation, as, say, M to *m*, and the converse relation *m* to M. Following the habits of ordinary language with respect to the voices of the verb, active and passive, and using any relation, say A, to form an example of the ways of speech used in respect to the distinction under notice, M is said to be "A to" *m* (or sometimes M "A's" *m*) in case of the direct relation, and *m* is said to be "A'd by" M in case of the converse relation.

Then (all the nomenclature and phrasings being understood) it is plain that the formulation of the problem above stated indicates and justifies certain definitional statements as follows:

K is a system of some kind or other.

K has at least one member, may be several, may be a good many, even an infinity.

The members of K are formulated by the relation A.

B—A says Some B is A, but (B—A) says No B is A. Now negate (i. e. deny) the assertion. Some B is not-A, i. e. B-(-A) by enclosing it with a second cut, (indicated by square brackets) thus [B-(-A)]. Here we have a *scroll* and it should be plain that it says that it is false that there is any B that is not A, which is the same as to say that whatever B there may be is A, or in inexact enunciation, All B is A.

Whatever is doubly enclosed or enclosed in an even number of cuts we may if it suits our turn take as not enclosed at all. The outside cut of the two denies the denial of the inside cut. Two negatives make an affirmative.

The point of teridentity imports simply that whatever identity is imported by one of the lines that join there is imported by each of the two other lines, so that each line may bear three messages of identity just as a telegraph wire may bear several messages without interference.

When relative terms are introduced each will have as many lines of identity as the relation by its nature requires, usually two, occasionally three, and sometimes, though very rarely, four. In writing and in reading these relations we have to notice and obey a certain way of process from their relates to their correlates, and from their correlates back to their relates, or if the relation is triadic, from one of the correlates to the other.

There are six kinds of graphs for the expression of dual relations. Each of these kinds varies as either of the terms is positive or negative, and as the relative term is positive or negative. Thus the forms are quite numerous and I must give here only two examples the forms of which will be found in use farther on. Bearing in mind the intersection of the parenthesis-horn and taking M to stand for member and C to stand for candidate and p to stand for the relative term "prior to," M -(- p — C) says Some mem-

ber is not prior to any candidate. Its negative [M -(- p —C)] says, Every member is prior to some candidate.

The definitional statements above given are diagrammed by Prof. Peirce in Fig. 11, which is a composite of three scrolls, (1) the outer scroll formed by the two outside cuts, (2) the mediate scroll, viz., that one at the right-hand side of the enclosure of the second cut, and (3) the inner and composite scroll at the left-hand side of said enclosure.

In reading the graphs it must be kept in mind that they express largely denials. This makes a style of discourse that is so full of inverted propositions and negative conceptions that it is highly unnatural. That a proposition is true is expressed by saying (diagrammatically of course) that it is false that it is false. But for exact logic such a style of expression has that high utility that it would be almost folly to neglect it. In exact logic the forms and rules must be perfectly sound for all possible cases. This makes it irksome and dangerous to try to express with perfect precision an affirmation that will serve therein. But a proposition can be expressed by way of denial with ease and precision and without any special need of providing against the "range of possibilities."

On page 444 Professor Peirce had given the precise and analytical reading of Fig. 11, and it would be useless to repeat it here. Just below it he has given the more natural reading. Now it is the outer scroll that says that K has a member (the M in the outer unshaded enclosure) and has a relation C (duly to be found out and named A-hood). It is the mediate scroll that says that every member of K is A (= C) to some member of K, and it is the inner scroll that says that whatever P is true of one member of K and at the same time untrue of another member of K, is true also of some member that is not "A to" any member of which P is true. The Roman numerals

are only empty blanks. All they indicate is a relation of some kind, I indicates a relation of one blank and II a relation of two blanks, which C and the ligature say is the relation C (A-hood). I is the empty predicate which the upper part of the inner scroll says is true of some member and untrue of some (other) member. The lower part of the inner scroll says that I (that is, P) is true of some member that is not "A to" any member of which I (that is, P) is true.

Having prepared therefor by graphs and otherwise, Mr. Peirce begins at page 446 and pursues through several pages a consecutive train of perfectly flawless deduction that is so admirable that no words are available to characterize it in fit measure. As an example it teems with instruction and suggestions, and as its leading result it shows that the core, the essence, of the copular relation when it is purified of everything but itself alone, is the relation of immediate antecedence, a relation *sui generis*, and such that if A immediately antecedes B, and B immediately antecedes C, then nothing else but A can immediately antecede B, and nothing else but B can immediately antecede C, and also that nothing else but C can immediately succeed B nor can anything else but B immediately succeed A. If this seems to any one an unprofitable result for so much pains, I suppose he will keep on thinking so until he has a wider survey of the field of knowledge and of what is needed for its extension. In the train of reasoning the succession of ten immediate inferences beginning on page 450 is worthy of special notice.

The last ten pages are again so predominantly mathematical and special that few lay readers will care to bestow the study needful for their mastery and it would be officious to undertake to gloss them for mathematicians.

Up to now I have said nothing about what I regard as the most excellent text of the article, viz., that part from

page 433 to page 440. My reason for this has been that my office in this article has been to explain as well as I am able some of the more difficult matters but not too difficult to make accessible to the non-mathematical reader and to the person not versed in the regenerated logic, and the part I am now speaking about needs no such explanation. In this part Prof. Peirce lays out and develops a philosophy of intellectual discovery, provides a nomenclature and illustrates his doctrine by a commentary upon the method of Euclid. In my humble opinion Prof. Peirce in this part has not only illuminated several very dark corners of the field of inquiry but has also indicated foundations and principles that sooner or later will win general acceptance.

FRANCIS C. RUSSELL.

CHICAGO, ILL.

SOME AMAZING MAZES.

[CONCLUSION.]

EXPLANATION OF CURIOSITY THE FIRST.

You remember that at the end of my description of the card "trick" that made my first curiosity, I half promised to give, some time, an explanation of its rationale. This half promise I proceed to half redeem.

Suppose a prime number, P, of cards to be dealt into S (for *strues*) piles, where $S<P$. (Were $S=P$, it would be impossible to regather the cards, according to the rule given in the description of the "trick.") Then, in each pile, every card that lies directly on another occupied, before the deal, the ordinal, or serial, place in the packet whose number was S more than that of the other; and using Q to denote the integral part of the quotient of the division of P by S, so that $P-QS$ is positive, while $P-(Q+1)S$ is negative (for P being prime, neither can be zero,) and assuming that the piles lie in a horizontal row, and that each card is dealt out upon the pile that is next on the right of the pile on which the last preceding card was dealt, it follows that the left-hand piles, to the number of $P-QS$ of them, contain each $Q+1$ cards, while the $(Q+1)S-P$ piles to the right contain each only Q cards. It is plain, then, that, in each pile, every card above the bottom one is the one that before the dealing stood S places further from the back of the packet than did the card upon which it is placed in dealing. But in what ordinal place in the packet before the dealing did that card stand which after the regathering of the piles comes next in order after the card which just before the regathering of the piles lay at the top of any pile whose ordinal place in the row of piles, counting from the left, may be called the *s*th? In order to answer this question, we have first to consider that the effect of Standing Rule No. IV is that the pile that comes next after any given pile in the order of the regathered packet, counting, as we always do, from back to face, is the pile which was taken up *next before* that

given pile; and of course it is the bottom card of that pile to which our question refers. Now the rule of regathering is that, after taking up any pile we next take up, either the pile that lies P–QS places to the right of it, or else that which lies (Q+1)S–P places to the left of it. In other words, the pile that is taken up *next before* any pile, numbered s from the left of the row, is either the pile numbered s+QS–P (and so lies toward the *left* of pile s) or else is the pile numbered s+(Q+1)S–P (and so lies toward the *right* of pile s). But if pile number s were one of those which contain Q+1 cards each, since these are the first P–QS piles, we should have $s \leqq$P–QS, and the pile taken next before it, if it were to the left of it, would be numbered less than or equal to zero; and there is no such pile. Consequently in that case, that pile taken up next before pile s will be to the right of the pile numbered s, and its number will be s+(Q+1)S–P, which will also have been the number of its bottom card in the packet before the dealing; while, since the bottom card of pile number s was card number s before the dealing, and since this pile contains Q other cards, each originally having occupied a place S further on than the one next below it in the pile, it follows that its top card was, before the dealing, the card whose ordinal number was s+QS. Thus, while every other card of any of the first P–QS piles is followed after the regathering by a card whose original place was numbered S more than its own, the top card of such a pile will then be followed by a card whose original place was S more than its own, *counting round a cycle of* P *cards.* In a similar way, if pile number s contains only Q cards, it is one of the last (Q+1)S–P piles. Then it cannot be that the pile taken up, according to the rule, next before it lay to the right of it; for in that case the number of this previously taken pile would exceed S. It must therefore be pile number s+QS–P; and this will be the original number of its bottom card, while the original number of the top card of pile number s (since this contains only Q cards,) will be s+(Q–1)S. Hence, as before, the top card will be followed after the regathering by a card whose original place would be S greater than its own, but for the subtraction of P in counting round a cycle of P numbers. This rule then holds for all the cards.

It follows that if, after the regathering, the last card, that at the face of the pack or in the P place is the one whose original place may be called the Πth, then any other card, as that whose place after the gathering is the lth, was originally in the $\Pi+l$S–mP, where mP is the largest multiple of P that is less than $\Pi+l$S. If

however, after the regathering, the pack be cut so as to bring the card which was originally the Pth, or last, that is, which was at the face of the pack, back to that same situation, then, since the original places increase by S (round and round a cycle of P places) every time the regathered places increase by 1, it follows that the original place of the card that is first subsequently to that cutting will have been S, that of the second, 2S, etc.; and in general, that of the *l*th will have been *l*S–*m*P. If the cards had originally been arranged in the order of their face values, the face value of the card in the *l*th place after the cut will be *l*S–*m*P, which we may briefly express by saying that the dealing into S piles with the subsequent cutting that brings the face card back to its place, "cyclically multiplies the face-value of each card by S," the cycle being P. If after dealing into S piles, another dealing is made into T piles, and another into U piles, etc., after which a cut brings the face card back to its place, the face value of every card will be cyclically multiplied by S×T×U× etc. Moreover, if cuttings were made before each of the dealings, since each cutting only cyclically adds the same number to the place of every card, the cards will still follow after one another according to the same rule; so that the final cutting that restores the face card to its place, annuls the effect of all those previous cuttings.

My hints as to the rationale of the exceptional treatment of the last card in twelve initial deals, and as to the extraordinary relation which results between the orders of succession of the black and of the red cards must be prefaced by some observations on the effects of reiterated dealings into a constant number of piles. What I shall say will apply to a pack of any prime number of cards greater than two; but to convey more definite ideas I shall refer particularly to a suit of 13 cards, each at the outset having its ordinal number in the packet equal to its face-value. The effect of one cyclic multiplication of the face-values by 2, brought about by dealing the suit into 2 piles, regathering, and cutting, if need be, so as to restore the king to the face of the packet, will be to shift all the cards except the king in one circuit. That is, the order before and after the cyclic multiplication being as here shown.

Before the cyclic doubling of

the face values .....1, 2, 3, 4, 5, 6, 7, 8, 9, X, J, Q, K.

After the same .....2, 4, 6, 8, X, Q, 1, 3, 5, 7, 9, J, K.

the 2 takes the place of the 1, the 4 that of the 2, the 8 that of the 4, the 3 that of the 8, the 6 that of the 3, the Q that of the 6, the J that of the Q, the 9 that of the J, the 5 that of the 9, the X that of the

5, the 7 that of the X, and the 1 that of the 7; so that the values are shifted as shown by the arrows on the circumference of the circle of Fig. 6. If 7, instead of 2, be the number of piles into which the thirteen cards are dealt there will be a similar shift round the same circuit, but in the direction opposite to the pointings of the arrows; and if the cards are dealt into 6 or into 11 piles, there will be a shift in a similar single circuit along the sides of the inscribed stellated polygon. But if the 13 cards are dealt into a number of piles other than 2, 6, 7, or 11, the single circuit will break into 2, 3, 4, or 6 separate circuits of shifting. Thus, if the dealing be into 4 or into 10 piles, there will be two such circuits, each along the sides of a hexagon whose vertices are at alternate points along

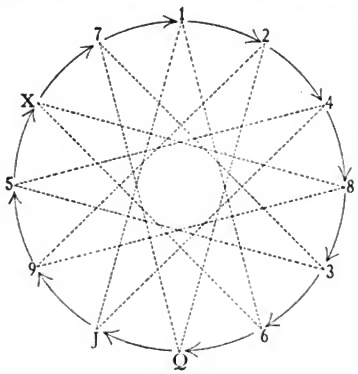


Fig. 6.

the circumference of the circle in the same figure (or, what comes to the same thing, at alternate vertices, along the periphery of the stellated polygon). Dealing into 4 piles makes one round from 1 to 4, from 4 to 3, from 3 to Q, from Q, to 9, from 9 to X, and from X back to 1; while another round is from 2 to 8, from 8 to 6, from 6 to J, from J to 5, from 5 to 7, and from 7 back to 2. Dealing into 5 or into 8 piles will make three circuits each from one vertex to the next one of 3 squares inscribed in the circle. Dealing into 3 or into 9 piles will give 4 circuits round three inscribed equilateral triangles. Finally, dealing into 12 piles, with regathering, etc. according to rule, simply reverses the order so that the ace and queen, the 2 and knave, the 3 and ten, etc. change places.

It has already been made evident that if any prime number, P, of cards, each inscribed with a number, so that, when operations begin this number shall be equal to the ordinal place of the card in the pack, be dealt into any lesser number, S, of piles, and these be re-gathered, etc. according to rule, the effect is cyclically to multiply by S the number inscribed on any card which is identified solely by its resulting ordinal place, that is, to multiply in counting the numbers round and round a cycle of P numbers,—or, to state it otherwise, the ordinary product has the highest lesser multiple of P subtracted from it, though this seems to me to be a needlessly complicated form of conceiving the cyclical product. In counting round and round, the number of numbers in the cycle, the so-called "modulus of the cycle," is the same as zero; so that the product of its multiplication by S is zero; or, regarding the matter in the other way, SP diminished by the largest lesser multiple of P gives P. Consequently, the face card will not change its face-value. Let the dealing etc. be reiterated until it has been performed δ times. The effect will be to multiply the face-values (of cards identified only by their final ordinal places) by S^{δ}. Since this is the same multiplier for all the cards, it follows that when δ attains such a value that the card in any one place, with the exception of the face card of the pack, *which alone retains an unchanging value*, recovers its original value, every one of the P–1 cards of (apparently) changing values equally recovers its original value; and if the values do not shift round a single circuit of P–1 cards, all the circuits must be equal; for otherwise the single number S^{δ} would not fix the values of all the cards. And since zero, or P, is the only number that remains unchanged by a multiplication where the multiplier is not unity (and S is always cyclically greater, that is, more advanced clockwise, than 1 and less than P,) it follows that the moduli of the shifts must all be the same divisor of P–1, and consequently P–1 deals, whatever be the constant number of piles, must restore the original order. The pure arithmetical statement of this result is that S^{P-1}, whenever P is a prime number and S not a multiple of it, must exceed by one some multiple of P. This proposition goes by the name of its discoverer, perhaps the most penetrating mind in the history of mathematics; being known as "Fermat's theorem"; although from our present point of view, it may seem too obvious to be entitled to rank as a "theorem." The books give half a dozen demonstrations of it. It lies at the root of cyclic arithmetic.

Fermat said he possessed a demonstration of his theorem: and

there is every reason for believing him; but he did not publish any proof. About 1750, the mathematician König asserted that he held an autograph manuscript of Leibniz containing a proof of the proposition; but it has never been published, so far as I know. Euler, at any rate, first published a proof of it; and Lambert gave a similar one in 1769. Subsequently Euler gave a proof less encumbered with irrelevant considerations; and this second proof is substantially the same as that in Gauss's celebrated "*Disquisitiones Arithmeticae*" of 1801, §49. Several other simple proofs have since been given; but none, I think, better than that derived from the consideration of repeated deals.

But what concerns the curious phenomenon of my little "trick" is not so much Fermat's theorem as it is the more comprehensive fact that, whatever odd prime number, P, the number of cards in the pack may be, there is some number, S, such that in repeated deals into that number of piles, all the numbers less than P shift round a single circuit. I hope and trust, Reader, that you will not take my word for this. If fifty years spent chiefly with books makes my counsel about reading of any value, I would submit for your approbation the following maxims:

I. There are more books that are really worth reading than you will ever be able to read. Confine yourself, therefore, to books worth reading and re-reading; and as far as you can, own the good books that are valuable to you.

II. Always read every book critically. A book may have three kinds of value. First, it may enrich your ideas with the mere possibilities, the mere ideas, that it suggests. Secondly, it may inform you of facts. Thirdly, it may submit, for your approbation, lines of thought and evidences of the reasonable connection of possibilities and facts. Consider carefully the attractiveness of the ideas, the credibility of the assertions, and the strengths of the arguments, and set down your well-matured objections in the margins of your own books.

III. Moreover, procure, in lots of twenty thousand or more, slips of stiff paper of the size of postcards, made up into pads of fifty or so. Have a pad always about you, and note upon one of them anything worthy of note, the subject being stated at the top and reference being made below to available books or to your own note books. If your mind is active, a day will seldom pass when you do not find a dozen items worth such recording; and at the end of twenty years, the slips having been classified and arranged and

rearranged, from time to time, you will find yourself in possession of an encyclopædia adapted to your own special wants. It is especially the small points that are thus to be noted; for the large ideas you will carry in your head.

If you are the sort of person to whom anything like this recommends itself, you will want to know what evidence there is of the truth of what I assert, that there is some number of piles into which any prime number of cards must be dealt out one less than that prime number of times before they return to their original order.

If these maxims meet your approval, and you read this screed at all, you will certainly desire to see my proposition proved. At any rate, I shall assume that such is your desire. Very well; proofs can be found in all the books on the subject from the date of Gauss's immortal work down. But all those proofs appear to me to be needlessly involved, and I shall endeavor to proceed in a more straightforward way, which "mehr rechnend zu Werke geht." Indeed, I think I shall render the matter more comprehensible by first examining a few special cases. But at the outset let us state distinctly what it is that is to be proved. It is that if P is any prime number greater than 2, then there must be some number of piles, S, into which a pack of P cards must be dealt (and regathered and cut, according to the rule) P–1 times in order to bring them all round to their original places again. The reason I limit the proposition to primes will presently appear: the reason I limit the primes to those that are greater than 2 is that two cards cannot, in accordance with the rule be dealt, etc., into more than one pile (if you call that dealing); and of course this does not alter the arrangement; and since there is no number of piles less than one, the theorem, in this case, reduces itself to an identical proposition; while if 1 be considered to be a prime number, the proposition is falsified since there is no number of piles into which one card can be dealt and regathered according to the rule, which requires S to be less than P.

Let our first example be that of P=17. Then P–1=16; and unless there be a single circuit of 16 face-values, which my whole present object is to show that there must be, all the circuits must either be one or more sets of 8 circuits of 2 values each, or sets of 4 circuits of 4 values each, or sets of 2 circuits of 8 values each; unless, indeed, we count in, as we ought to do, the case of 16 circuits of 1 value each. This last means that each of the 16 cards retains its face-value after a single deal. It is obtrusively obvious that this can only be when S=1. But since in these hints toward a demonstra-

tion of the proposition the particular values of S do not concern us, and had better be dismissed from our minds, we will denote this value of S by S^{xvi}, meaning that it is a value that gives 16 circuits. We will now ask what is the number of piles into which 2 dealings will restore the face-value of every card; or, in other words, will give 8 circuits of 2 values each. Letting x denote that unknown quantity, the number of piles, or the cyclic multiplier, the equation to determine it is $x^2=1$. To many readers two values satisfying this equation will be apparent. But I do not care what they are, further than that the value $x=1$ obviously satisfies the equation $x^2=1$. I do care, however, to show that there can be but two solutions of the equation $x^2=1$. For suppose that $x_1^2=1$ and $x_2^2=1$. Then $x_1^2-x_2^2=(x_1+x_2)\cdot(x_1-x_2)=0$ or equals mP. Now if a multiple of a prime number be separated into two or more factors, one of these, at least, must itself be a multiple of that prime, just as in the algebra of real and of imaginary quantities and in quaternions, if the product of several quantities be zero, one or other of those factors must be zero; and just as in logic, if an assertion consisting of a number of asserted items be false, one or more of these items must be false. In addition, every summand has its own independent effect; but every unit of a product is compounded of units of all the several factors. This is the formal, or purely intellectual, principle at the root of all the reasons for making the number of cards dealt, especially in reiterated dealings, to be a prime. It follows, then, that there are but two numbers of piles dealings into each of which will restore the original arrangement after 2 deals; and one of these is $x=1$; for evidently (bear this in mind,) if $x^a=1$, then also $x^{(ab)}=(x^a)^b=1$. There is then but one number of piles dealings into which shift the values of the cards in eight, and only eight, circuits; and this number we will denote by S^{viii}. Then, reserving x to denote any root of the equation $x^2=1$, and taking ξ to denote that one of the two roots that is not 1, we will take y to denote any number of piles, after dealing into which 4 times, the resulting arrangement of the values will be the original arrangement. That is to say, y will be any root of the cyclic equation $y^4=1$. But $x^4=(x^2)^2=1^2=1$; so that any value of x is a value of y. Let η denote any value of y that is not a value of x; and let us suppose that there are two values of η, which we may denote by S^{iv} and S^{xii}. It will be easy to show that there is no third value of η. For $(\eta^2)^2=1$, where η^2 fulfills the definition of x and is thus either 1 or ξ. But the roots of the equation $\eta^2=1$ fulfill the definition of x, whose values are excluded from the

definition of η. Hence we can only have $\eta^2=\xi$; and that this has but two roots is proved by the same argument as was used above. Namely, η_1 and η_2 being any two of these, $(\eta_1^2-\eta_2^2)=(\eta_1+\eta_2)\cdot(\eta_1-\eta_2)$ $=0$, so that unless η_1 and η_2 are equal, and $\eta_1-\eta_2=0$, then $\eta_1+\eta_2=0$ or η_1 and η_2 are negatives of each other. Now no more than 2 quantities can be each the negative of each of the others. We now pass to the consideration of those numbers of piles into which eight successive dealings result in the original arrangement. Denoting by z any such number, it is defined by the equation $z^8=1$. But every value of y (of which we have seen that there cannot be more than 4,) satisfies this equation, since $y^8=(y^4)^2=1^2=1$. Let ζ denote any value of z which is not a value of y. We may suppose that there are two of these for each of the two values of η, which we will designate as S^{ii}, S^{vi}, S^{x}, S^{xiv}. I need not assert that there are so many; but my argument requires me to prove that there are no more. The equation $(z^2)^4=z^8=1$ shows that z^2 fulfills the definition of y and can therefore have no more than the four values 1, ξ, and the two values of η. Now if $z^2=1$, z can, as we have seen in the case of x, have no other values than $z=1$ and $z=\xi$, both of which are values of y.

If $z^2=\xi$, as we have seen in regard to y, z can have no other values than the two values of η, which are again values of y. Now let us suppose that z has four values, S^{ii}, S^{vi}, S^{x}, and S^{xiv}, that are not values of y; and let us define ζ as any value of z that is not a y. The proof that there can be no more than four ζs is so exactly like the foregoing as to be hardly worth giving. I will relegate it to a paragraph of its own that shall be both eusceptic and euskiptatic;—"what horrors!' I hear from the mouths of those moderns who abominate all manufactures of Hellenic raw materials, like "skip" and "skimp."

We have seen that either $z^2=1$, or $z^2=\xi$, or $z^2=\eta$; and also that, in the first case, either $z=1$ or $z=\xi$, both of which are values of y; and that, in the second case, z has one or other of the two values of η. Accordingly, it only remains that $\zeta^2=\eta$. There are but two values of η and if ζ_1 and ζ_2 are two different values of ζ whose squares are the same value of η, $\zeta_1^2-\zeta_2^2=(\zeta_1+\zeta_2)\cdot(\zeta_1-\zeta_2)=0$. Hence, since $\zeta_1-\zeta_2$ is not zero, it follows that every value of ζ differs from every other value derived from the same η only by being the negative of it. Now no number has two different negatives; and therefore there can be no more than two ζs to every η: and there being no more than two ηs, there can be no more than four ζs.

Now this is the summary of the whole argument: the 17 cards of the pack being consecutively inscribed with numbers from the back to the face of the pack, each number of piles into which they are dealt etc. according to the rule acts as a cyclic multiplier of the face-value of every card. Every such multiplier leaves 0(=17) unchanged, and shifts the other 16 face-values in a number of circuits having the same number of values in each. The possible consequences, excluding the case of a single circuit of 16 values, are the following:

16 circuits of 1 value each can result from but	1 multiplier at the utmost.
8 circuits of 2 values each can result but from	1 other multiplier
4 circuits of 4 values each can result but from	2 other multipliers
2 circuits of 8 values each can result but from	4 other multipliers
In all the number of multipliers that give more than 1 circuit (of all 16 values) is.....	8 at most
But there are in all	16 multipliers
Hence, the number of multipliers that shift the values in 1 circuit of 16 values is.....	8, at least.

In point of fact, it is precisely 8.

Let us now consider a pack of 31 cards. Here, the zero card not changing its value, there are 30 values which are shifted in one of these ways:

In 30 circuits of 1 value each;
In 15 circuits of 2 values each;
In 10 circuits of 3 values each;
In 6 circuits of 5 values each;
In 5 circuits of 6 values each;
In 3 circuits of 10 values each;
In 2 circuits of 15 values each;
In 1 circuit of 30 values.

I propose to show as before that if we exclude the last case, the others do not account for the effects of so many as 30 different multipliers. In the first place, as in the last example, but one multiplier will give circuits of one value each; and but one other multiple will give circuits of only two values each. We may call the former S^{xxx} and the latter S^{xv}.

The problems of 10 circuits of 3 values each and of 6 circuits of 5 values each can be treated by exactly the same method, 3 and

5 being prime numbers. I shall exhibit in full the solution of the more complicated of the two, leaving the other to the reader.

I propose, then, to show that there are at most but 5 different values which satisfy an equation of the form $s^5=1$. The general idea of my proof will be to assume that there are 5 different values (for it is indifferent to my purpose whether there be so many or not,) and then to show that there is such an equation between these five, that given any four, there is but one value that the fifth can have; that being as much as to say that there are not more than five such values in all. This assumes that every one of the five values differs from every one of the other four; making ten premisses of this kind that have to be introduced. Now to introduce a premiss into a reasoning, is to make some inference which would not necessarily follow if that premiss were not true. Assuming, then, that $s^5=1$, $t^5=1$, $u^5=1$, $v^5=1$, $w^5=1$, are the five assumed equations, I note that the division by one divisor of both sides of an equation necessarily yields equal quotients only if the divisor is known not to be zero. Hence if I divide my equations by $s-t$, by $s-u$, by $s-v$, by $s-w$, by $t-u$, by $t-v$, by $t-w$, by $u-v$, $u-w$, and by $v-w$, I shall certainly introduce the ten premisses that all the five values are different; and with a little ingenuity,—a *very* little, as it turns out,—I ought to reach my legitimate conclusion.

I will begin then by subtracting $t^5=1$ from $s^5=1$, giving $s^5-t^5=0$; and dividing this by $s-t$, and using $\cdot|\cdot$ as the logical sign of disjunction, that is, to mean "or else," I get

$$(1)\quad s^4+s^3t+s^2t^2+st^3+t^4=0 \cdot|\cdot s=t.$$

By analogy, I can equally write

$$s^4+s^3u+s^2u^2+su^3+u^4=0 \cdot|\cdot s=u.$$

Subtracting the latter of these from the former, I get,

$$s^3(t-u)+s^2(t^2-u^2)+s(t^3-u^3)+t^4-u^4=0 \cdot|\cdot s=t \cdot|\cdot s=u.$$

And dividing this by $t-u$, I obtain

$$(2)\quad s^3+s^2(t+u)+s(t^2+tu+u^2)+t^3+t^2u+tu^2+u^3=0 \cdot|\cdot s=t \cdot|\cdot s=u \cdot|\cdot t=u.$$

By analogy, I can equally write

$$s^3+s^2(t+v)+s(t^2+tv+v^2)+t^3+t^2v+tv^2+v^3=0 \cdot|\cdot s=t \cdot|\cdot s=v \cdot|\cdot t=v.$$

Subtracting the last equation from the last but one, I get

$$(s^2+st+t^2)(u-v)+(s+t)(u^2-v^2)+u^3-v^3=0 \cdot|\cdot s=t \cdot|\cdot s=u \cdot|\cdot s=v \cdot|\cdot t=u \cdot|\cdot t=v.$$

and dividing by $u-v$, I have

$$(3)\quad s^2+st+t^2+(s+t)(u+v)+u^2+uv+v^2=0 \cdot|\cdot s=t \cdot|\cdot s=u \cdot|\cdot s=v \cdot|\cdot t=u \cdot|\cdot t=v \cdot|\cdot u=v.$$

By analogy, I can equally write

$$s^2+st+t^2+(s+t)(u+w)+u^2+uw+w^2=0 \cdot|\cdot s=t \cdot|\cdot s=u \cdot|\cdot s=w \cdot|\cdot t=u \cdot|\cdot t=w \cdot|\cdot u=w.$$

Subtracting the last from the last but one, and dividing by $v-w$, I get

$$(4) \quad s+t+u+v+w=0 \cdot|\cdot s=t \cdot|\cdot s=u \cdot|\cdot s=v \cdot|\cdot s=w \cdot|\cdot t=u \cdot|\cdot t=v \cdot|\cdot t=w \cdot|\cdot u=v \cdot|\cdot u=w \cdot|\cdot v=w. \cdot$$

This shows at once that there cannot be more than 5 different numbers, which, counting round any prime cycle, all have their 5th powers equal to 1. By a similar process, as you can almost see without slate and pencil, from $x^3=1$, $y^3=1$, $z^3=1$ one can deduce $x+y+z=0 \cdot|\cdot x=y \cdot|\cdot x=z \cdot|\cdot y=z$. The existence of these 5 and these 3 numbers must, for the present, be regarded as problematic, except that we cannot shut our eyes to the fact that 1 is one of the members of each set; as indeed $1^\delta=1$, whatever the exponent may be.

I have numbered some of the equations obtained in the proof that there are no more than 5 fifth roots of unity. You will observe that (1) equates to zero the sum of all possible terms of the fourth degree formed by two roots; that (2) equates to zero the sum of all possible terms of the third degree formed by three roots; that (3) equates to zero the sum of all possible terms of the second degree formed from four roots; and that (4) equates to zero the sum of all possible terms of the first degree formed by all five roots. Now it is plain that if we assume that there are n unequal nth roots of unity, then by subtracting $x_2^n=1$ from $x_1^n=1$, and dividing by x_1-x_2, we shall equate to zero the sum of all possible terms of the $(n-1)$th degree in x_1 and x_2. And if we have proved, in regard to any m of the roots, that (all being unequal,) the sum of all possible terms of the $(n-m+1)$th degree in these roots is equal to zero; then by taking two such equations of the $(n-m+1)$th degree in $m-1$ roots common to the two, with one root in each equation not entering into the other; by subtracting one of these equations from the other, and then dividing by the difference between the two roots which enter each into but one of these equations, we shall get an equation of the $(n-m)$th degree in $m+1$ roots. For $x^n-y^n=(x-y)\cdot\sum_0^{n-1} x^i y^{n-i-1}$

Accordingly, by repetitions of this process, we shall ultimately find that the sum of the n roots, if there be so many, is 0. This proves that there can be no more than n unequal nth roots of unity in cyclic arithmetic any more than in unlimited real or imaginary arithmetic.

But if the root of unity be of an order not prime but composite, so that it is the root of an equation of the form $x^{pq}=1$, it is evident that it is satisfied by every root of $y^p=1$ and by every root of $y^q=1$; since every power of 1 is 1. Accordingly, exclusive of roots of a lower order, the number of roots of unity of order n, that is, the number of roots of $x^n=1$, additional to those that are roots of unity of lower order cannot be greater than the number of numbers not greater than n and prime to it. A number is said to be prime to a number when they have no other common divisor than 1. I shall write the expression of two or more numbers separated by heavy vertical lines to denote the greatest common divisor of those numbers. Thus, I shall write $12|18=6$. This vertical line may be considered as a reminiscence of the line that separates numbers in the usual algorithm of the greatest common divisor. A prime number is a number prime to every other number. Consequently, 1 is a prime number. It is the only prime number that is prime to itself; for $p|p=p$. The number of numbers not exceeding a number, n, but prime to it is now called the *totient* of n. In the books of the first four fifths of the nineteenth century, the totient of n was denoted by $\phi(n)$; but since the invention of the word *totient*, about 1880, Tn has become the preferable notation. T1=1: but if p be a prime not prime to itself Tp=p−1. It is quite obvious that the totient of any number, n, whose prime factors not prime to themselves are p', p'', p''', etc. is obtained by subtracting from n the p'th part of it, and then successively from each remainder the p''th, etc. part of it, but not using any prime factor twice. Thus T4=2 (for 4|1=1 and 4|3=1; but 4|2=2 and 4|4=4); T6=2 (for $6-\frac{1}{2}\cdot 6=3$ and $3-\frac{1}{3}3=2$); T8=4 (for $8-\frac{1}{2}\cdot 8=4$), T9=6, T10=4, etc. If $m|n=1$, then Tmn=(Tm)(Tn). On the other hand, if p is a prime and m any exponent, Tp^n=$(p-1)p^{n-1}$. A "perfect number" is defined as one which is equal to the sum of its "aliquot parts," that is, of all its divisors except itself; but, in a more philosophical sense, *every* number is a perfect number. That is to say, it is equal to the sum of the totients of *all* its divisors;—a proposition which is perfectly obvious if regarded from the proper point of view. However, since this proposition has some relevancy to the proposition I am endeavoring to prove; namely, that there is some number of piles, dealing into which shifts all the face-values of the cards along a single cycle, I will repeat a pretty demonstration of the former proposition that I find in the books. Having selected any number, m, rule a sheet of paper into columns, a column for each divisor

of m; and write these divisors, in increasing order from left to right each at the top of its column as its principal heading. Just beneath this, write in parentheses, as a subsidiary heading to the column, the complementary divisor, i. e., the divisor whose product into the principal heading is the number m; and draw a line under this subsidiary heading. Now, to fill up the columns, run over all the numbers in regular succession, from 1 up to m inclusive, writing each in one column, and in one only; namely in that column which is furthest to the right of all the columns of whose principal headings the number to be written is a multiple. Here, for example, is the table for m=20:

1 (20)	2 (10)	4 (5)	5 (4)	10 (2)	20 (1)
1	2				
3		4	5		
	6				
7		8			
9				10	
11		12			
13	14		15		
		16			
17	18				
19					20

By this means it is obvious that each column will receive all those multiples of the principal heading whose quotients by that heading are prime to the subsidiary heading, and will receive no other numbers. Thus, every column will contain just one number for each number prime to the subsidiary heading but not greater than it; [since no number is entered which exceeds the product of the two headings.] In other words, the number of numbers in each column equals the totient of the subsidiary heading; and since the subsidiary headings are all the divisors, and the total number of numbers entered is m, the sum of the totients of all the divisors of m is m, whatever number m may be. It will be convenient to have a name for this principle; and since, as I remarked, it renders every number a perfect number in a perfected sense of that term, or say a *perfecti perfect* number, I will refer to it as the *rule of perfection.*

According to this, although $x^6=1$ may have 6 roots, yet since x^2, x^3, and x^6 are also roots, by the rule of perfection there can be but $T6=T2\cdot T3=1\cdot 2=2$ numbers of piles into which dealing must

be made 6 times successively in order to restore the original arrangement; and similarly for the other divisors. So then the number of ways of dealing (i. e., number of piles into which the cards can be dealt, etc.) which will restore 31 cards to their original order in less than 30 deals cannot exceed T1+T2+T3+T5+T6+T10+T15. There are, however, in all 30 ways of dealing; and by the rule of perfection 30=T1+T2+T3+T5+T6+T10+T15+T30. Hence, there must be $T30=T2\cdot T3\cdot T5=1\cdot 2\cdot 4=8$ ways of dealing which shift the 30 values in a single circuit. And so with any other prime number than 31. This argument is so near a perfect demonstration that there always must be such ways of dealing that I may leave its perfectionment to the reader.

I do not know of any general rule for ascertaining what the particular numbers of piles are into which the prime number p of cards must be dealt $p-1$ times in order to bring round the original arrangement again. It seems that there is a *Canon Arithmeticus* got out by Jacobi, which gives the numbers for the first 170 primes or so. It was published in the year of my birth; so that it was clearly the purpose of the Eternal that I should have the advantage of it. But that purpose must have been frustrated; for I never saw the book. The *Tables Arithmétiques* of Hoüel (Gauthiers-Villars: 1866. 8vo. pp. 44) gives those numbers for all primes less than 200. From these tables it appears that for about five-eighths of the primes one such number is either 2 or $p-2$. Now as soon as one has been found, it is easy to find the rest which are all the powers of that one whose exponents are prime to $p-1$. In case $p-1$ has few prime factors, the numbers any one of which we seek must be nearly a third, perhaps nearly or quite half of all the $p-1$ numbers; so that ere many trials have been made, one is likely to light upon one of them. Thus if $p=17$, try 2. Now $2^4=16=-1$; so this will not do. Nor will -2. Try 3. We have $3^2=9=-8$; $3^3=27=-7$, $3^4=81=-4$, $3^8=(3^4)^2=(-4)^2=16=-1$. Evidently 3 is one of the numbers and the others are $3^3=-7$, $3^5=-12=5$, $3^7=(3^3)(3^4)=(-7)\cdot(-4)=28=-6$, and the negatives of these. If the prime factors are many, a different procedure may be preferable. Take the case of $p=31$. Here $p-1=2\cdot 3\cdot 5$. Turning to that table of the first nine powers of the first hundred numbers which is given in so many editions of Vega, I find in the column of cubes, $5^3=125=4(31)+1$, and $6^3=216=7\cdot 31-1$; and in the column of 5th powers, I find $3^5=243=8(31)-5$. Consequently, $(3^5)^3=3^{15}=-1$. This renders it *likely* that 3 may be such a number as I seek. $3^2=9$, $3^3=-4$, $3^4=-12$, $3^5=-5$, $3^6=16=-15$, $3^{10}=-6$, $3^{12}=+8$, 3^{15}

$=(3^5)^3=-125=1$. It is evident that 3 is one of the numbers. The other seven are $3^7=3^5\cdot 3^2=-45=-14$, $3^{11}=3\cdot 3^{10}=-18=13$, $3^{13}=3\cdot 3^{12}=24=-7$, $3^{17}=3^{15}\cdot 3^2=-9$; $3^{19}=3^{15}\cdot 3^4=+12$, $3^{23}=3^{19}\cdot 3^4=-144=+11$, $3^{29}=3^{17}\cdot 3^6=(-9)\cdot(-15)-135=+11$.

Since, then, whatever prime number not prime to itself p may be, there are always $T(p-1)$ numbers of which the lowest power equal to 1 (counting round the p cycle,) is the $(p-1)$th and these powers run through all the values of the cycle excepting only $p=0$, it follows that these numbers may appropriately be called *basal* (or *primitive*) roots of the cycle; and that their exponents are true *cyclic logarithms* of all the numbers of the cycle except zero. But since, if b be such a basal root, its $(p-1)$th power, like that of any other number, equals 1 (counting round the p-cycle), it follows that these exponents run round a cycle smaller by one unit than that of their powers; or in other words, the *modulus* of the cycle of logarithms is $p-1$, while the modulus of the cycle of natural numbers is p.*

The cyclic logarithms form an entirely distinct number-system from that of the corresponding natural numbers. For the modulus

* This being the first occasion I have had in this essay to employ the word "'modulus," I will take occasion to say that its general meaning is now well established. It means that signless quantity which measures the magnitude of a quantity and is a factor of it. So that if M and M′ are the moduli of two quantities, $M\mu$ and $M'\mu'$, their product is $MM'\cdot\mu\mu'$, where MM′ is an ordinary product, but $\mu\mu'$ may be a peculiar function. Thus, the absolute value of -2, or 2, is its "modulus," as 3 is of -3; and $(-2)\cdot(-3)=+6$ where $2\times 3=6$ by ordinary multiplication, but $(-1)\times(-1)=+1$ by an extension of ordinary multiplication. So the "modulus" of $A+Bi$, where $i^2=-1$, is $\sqrt{A^2+B^2}$. The tensor of a quaternion and the determinant of a square matrix are other examples of moduli. The cardinal number of numbers in a cycle has no sign and may properly be called the modulus of the cycle. But I sometimes refer to it as "the cycle," for short. The present usage of mathematicians is to use, what seems to me a too involved way of conceiving of cyclic arithmetic which carries with it an irregular use of the word "modulus." Legendre and the earlier writers on cyclic arithmetic conceived of its numbers as signifying the lengths of different steps along a cycle of objects, and thus spoke of 18 as being *equal* to 1 on a cycle of 17, just as we say that the 1st, 15th, 22d, and 29th days of August fall on *the same* day of the week, and just as we say that 270° of longitude west of any meridian and 90° east of it are *the very same* longitude. Gauss, however, introduced a different locution, involving quite another form of thought. Instead of saying that 18 *is*, or *equals*, 1 in counting round a cycle of modulus 17, he prefers to say that 18 and 1 belong to the same *class* of numbers *congruent to* one another for the *modulus* 17. Here the idea of a cycle appears to be rejected in favor of the idea that $(18-1)/17$ is a whole number.

Now I fully admit that the conception of an indefinitely advancing series is involved in that of a cycle, and further that non-cyclical numbers have to be used to some extent in cyclic arithmetic. But at the same time it seems to me that the theoric idea of a cycle ought to take the lead in this branch of mathematics. In particular, I cannot see why the term *cyclic logarithms* is not perfectly correct and far more expressive than Gauss's colorless name of "indices."

of their cycle is composite instead of prime, a circumstance which essentially modifies some of the principles of arithmetic. For example, every natural number of a cycle of prime modulus gives an unequivocal quotient when divided by another. But some numbers in a cycle of composite modulus give two or more quotients when divided by certain others, while others are not divisible without remainders. The whole doctrine shall be set forth here. I will preface it with a statement of the essential differences between the system of all positive finite integers, the system of all real finite integers, and any cyclical system. I omit the Cantorian system, partly because the full explanation of it would be needed and would be long, and partly because there is a doubt whether it really possesses an important character which Cantor attributes to it.

It is singular that though the systems to be defined possess, besides several independent common characters, others in respect to which they differ, yet *all* the properties of each system are necessary consequences of a single principle of immediate sequence. In stating this, I shall abbreviate a frequently recurring phrase of nine syllables by writing, '*m* is A of (or to) *n*,' or even '*m* is A*n*,' to mean that the member, *m*, of the system is in a certain relation of immediate antecedence to the member *n*. I shall express the same thing by writing '*n* is A'd by *m*.' But when I call A an abbreviation, I do not mean to imply that the words "immediately antecedent" express its meaning in a satisfactory way. On the contrary, in part, they suggest something repugnant to its meaning, which must be gathered exclusively from the following definitions of the three kinds of systems:

A *cyclical system* of objects is such a collection of objects that, the expression '*m* is A to *n*' signifying some recognizable relation of *m* to *n*, every member of the system is A to some member or other, and whatever predicate, P, may be, if P is true of no member of the system without being true of some member of it that is A'd by that member, then P is true either of no member or of every member.

The system of all positive whole numbers is a single collection of numbers, the general essential character of which collection is that there is a recognizable relation signified by A, such that every positive integer is A to a positive integer, and there is one, and one only, initial positive integer, 0 (or, if this be excluded, then 1,) such that, whatever predicate P may be, if P is true of no positive integer without being also true of some positive integer to which

the former is A, then either this predicate is false of that initial positive integer or else is true of all positive integers.

The system of all real integers is a collection of numbers of which the general essential character is that there is recognizable relation signified by one being A to another, such that every number of the system is both A to a number of the system, and is A'd by a number of the system, and whatever predicate P may be, if this be not true of any number, *n*, of the system without being both true of some number that is A of *n*, and true also of some number that is A'd by *n*, then P is either false of every number of the system or is true of every number of the system.

A *Cantorian* system is essentially a system of objects positively determined by every collection of objects of the system being A to some object of the system, and by a certain object, 0, being a member of the system; while it is negatively determined by the principle that, whatsoever predicate P may be, if P is not true of every member of any collection of the system without being also true of some member that is A'd by that collection, then either P is not true of the member, 0, or it is true of every member of the system.

Now for several reasons, partly for the sake of the logical interest and instruction that will accrue I will proceed to show precisely *how* all the fundamental properties common to cyclical systems follow from my definition. In accordance with the usage of logicians and mathematicians, I shall call this "demonstrating" those properties. The reader must not fall into the error of supposing that, by this expression, I mean *rationally convincing* him that all cyclical systems have these properties; for I know well that he is perfectly cognizant of that already. All I am seeking to convince him of is, 1st, *that*, and 2d, *how*, their truth of all cyclical systems follows from my definition. But in the course of doing so, I shall endeavor to bring to his notice some things well worth knowing concerning necessary reasonings in general. Especially, I shall try to point out errors of logical doctrine which students of the subject who neglect the logic of relations are apt to fall into.

A brace of these errors, are, first, that nothing of importance can be deduced from a single premiss; and secondly, that from two premisses one sole complete conclusion can be drawn. Persons who hold the latter notion cannot have duly considered the paucity of the premisses of arithmetic and the immensity of higher arithmetic, otherwise called the "theory of numbers," itself. As to the former belief, aside from the consideration that whatever follows

from two propositions equally follows from the one which results from their copulation, they will have occasion to change their opinion when they come to see what can be deduced from the definition of a cyclic system, which definition is not a copulative proposition.

That couple of logical heresies, being married together, legitimately generates a third more malignant than either; namely, that necessary reasoning takes a course from which it can no more deviate than a good machine can deviate from its proper way of action, and that its future work might conceivably be left to a machine,—some Babbage's analytical engine or some logical machine (of which several have actually been constructed). Even the logic of relations fails to eradicate that notion completely, although it does show that much unexpected truth may often be brought to light by the repeated reintroduction of a premiss already employed; and in fact, this proceeding is carried to great lengths in the development of any considerable branch of mathematics. Although, moreover, the logic of relations shows that the introduction of abstractions,—which nominalists have taken such delight in ridiculing,—is of the greatest service in necessary inference, and further shows that, apart from either of those manoeuvres,—either the iteration of premisses or the introduction of abstractions,—the situations in which the necessary reasoner finds several lines of reasoning open to him are frequent. Nevertheless, in spite of all this, the tendency of the logic of relations itself,—the highest and most rational theory of necessary reasoning yet developed,—is to insinuate the idea that in necessary reasoning one is always limited to a narrow choice between quasi-mechanical processes; so that little room is left for the exercise of invention. Even the great mathematician, Sylvester, perhaps the mind the most exuberant in original ideas of pure mathematics of any since Gauss, was infected with this error; and consequently, conscious of his own inventive power, was led to preface his "Outline Trace of the Theory of Reducible Cyclodes," with a footnote which seems to mean that mathematical conclusions are not always derived by an apodictic procedure of reason. If he meant that a man might, by a happy guess, light upon a truth which might have been made a mathematical conclusion, what he said was a truism. If he meant that the hint of the way of solving a mathematical problem might be derived from any sort of accidental experience, it was equally a matter of course. But the truth is that all genuine mathematical work, except the formation of the initial postulates (if this be regarded as mathematical

work,) is necessary reasoning. The mistake of Sylvester and of all who think that necessary reasoning leaves no room for originality,—it is hardly credible however that there is anybody who does not know that mathematics calls for the profoundest invention, the most athletic imagination, and for a power of generalization in comparison to whose every-day performances the most vaunted performances of metaphysical, biological, and cosmological philosophers in this line seem simply puny,—their error, the key of the paradox which they overlook, is that originality is not an attribute of the *matter* of life, present in the whole only so far as it is present in the smallest parts, but is an affair of *form*, of the way in which parts none of which possess it are joined together. Every action of Napoleon was such as a treatise on physiology ought to describe. He walked, ate, slept, worked in his study, rode his horse, talked to his fellows, just as every other man does. But he combined those elements into shapes that have not been matched in modern times. Those who dispute about Free-Will and Necessity commit a similar oversight. Notwithstanding my tychism, I do not believe there is enough of the ingredient of pure chance now left in the universe to account at all for the indisputable fact that mind acts upon matter. I do not believe there is any amount of *immediate* action of that kind sufficient to show itself in any easily discerned way. But one endless series of mental events may be immediately followed by a beginningless series of physical transformations. If, for example, all atoms are vortices in a fluid, and every fluid is composed of atoms, and these are vortices in an underlying fluid, we can imagine one way in which a beginningless series of transformations of energy* might take place in a fraction of a second. Now whether this particular way of solving the paradox happens to be the actual way, or not, it suffices to show us that from the supposed fact that mind acts *immediately* only on mind, and matter *immediately* only on matter, it by no means follows that mind cannot act on matter, and matter on mind, without any *tertium quid*. At any rate, our power of self-control certainly does not reside in the smallest bits of our conduct, but is an effect of building up a character. All supremacy of mind is of the nature of Form.

The plan of a demonstration can obviously not spring up in the mind complete at the outset; since when the plan is perfected, the

* You may well be puzzled, dear Reader, to iconize the consecution of a beginningless series upon an endless series. But you have only to imagine a dot to be placed upon the rim of a half-circle at each point whose angular distance from the beginning of the semicircumference has a positive or nega-

demonstration itself is so. The thought of the plan begins with an act of ἀγχίνοια* which, in consequence of pre-existent associations, brings out the idea of a possible object, this idea not being itself involved in the proposition to be proved. In this idea is discerned that the possibility of its object follows in some way from the condition, general subject, or antecedent of the proposition to be proved, while the known characters of the object of the new idea will, it is perceived, be at least adjuvant to the establishment of the predicate or consequent of that proposition.

I shall term the step of so introducing into a demonstration a new idea not explicitly or directly contained in the premisses of the reasoning or in the condition of the proposition which gets proved by the aid of this introduction, a *theōric* step. Two considerable advantages may be expected from such a step besides the demonstration of the proposition itself. In the first place, since it is a part of my definition that it really aids the demonstration, it follows that without some such step the demonstration could not have been effected, or at any rate only in some very peculiar way. Now to propositions which can only be proved by the aid of theoric

tive whole number for its natural tangent. These dots will, then, occur at the following angular distances from the origin of measurement.

ANGULAR DISTANCE	TANGENT
0° 00′	0
45 00	+ 1
63 26	+ 2
71 34	+ 3
75 58	+ 4
78 41	+ 5
80 32	+ 6
81 52	+ 7
82 52	+ 8
83 40	+ 9
84 17	+10
84 48	+11
85 14	+12
85 36	+13
85 55	+14
86 11	+15
86 25	+16
86 38	+17
86 49	+18
86 59	+19
87 08	+20
87 16	+21
87° 24′	+22
87 31	+23
87 37	+24
87 43	+25
and so on endlessly. But after all positive integer values have been passed through before 90°, (where there will not be any dot,) a beginningless series of dots will succeed, for which the tangents are negative; and then	
92° 17′	—25
92 23	—24
92 29	—23
92 36	—22
92 44	—21
92 52	—20
93° 01′	—19
93 11	—18
93 21	—17
93 35	—16
93 49	—15
94 05	—14
94 24	—13
94 46	—12
95 12	—11
95 43	—10
96 20	— 9
97 08	— 8
98 08	— 7
99 28	— 6
101 19	— 5
104 02	— 4
108 26	— 3
116 34	— 2
135 09	— 1
180 00	0
225 00	+ 1
etc.	

* See *Charmides*, p. 160A, and the last chapter of the First *Posterior Analytics*.

steps. (or which, at any rate, could *hardly* otherwise be proved,) I propose to restrict the application of the hitherto vague word "*theorem*," calling all others, which are deducible from their premisses by the general principles of logic, by the name of *corollaries*. A theorem, in this sense, once it is proved, almost invariably clears the way to the corollarial or easy theorematic proof of other propositions whose demonstrations had before been beyond the powers of the mathematicians. That is the first secondary advantage of a theoric step. The other such advantage is that when a theoric step has once been invented, it may be imitated, and its analogues applied in proving other propositions. This consideration suggests the propriety of distinguishing between varieties of theorems, although the distinctions cannot be sharply drawn. Moreover, a theorem may pass over into the class of corollaries, in consequence of an improvement in the system of logic. In that case, its new title may be appended to its old one, and it may be called a *theorem-corollary*. There are several such, pointed out by De Morgan, among the theorems of Euclid, to whom they were theorems and are reckoned as such, though to a modern exact logician they are only corollaries. If a proposition requires, indeed, for its demonstration, a theoric step, but only one of a familiar kind, that has become quite a matter of course, it may be called a *theoremation*.* If the needed theoric step is a novel one, the proposition which employs it most fully may be termed a *major theorem*; for even if it does not, as yet, appear particularly important, it is likely eventually to prove so. If the theoric invention is susceptible of wide application, it will be the basis of a mathematical method.

But mathematicians are rather seldom logicians or much interested in logic; for the two habits of mind are directly the reverse of each other; and consequently a mathematician does not care to go to the trouble, (which would often be very considerable,) of ascertaining whether the theoric step he proposes to himself to take is absolutely indispensable or not, so long as he clearly perceives that it will be exceedingly convenient; and the consequence is that many demonstrations introduce theoric steps which relieve the mind and obviate confusing complications without being logically necessary. Such demonstrations prove corollaries more easily by treating them as if they were theorems. They may be called *theoric corollaries*, or if one is not sure that they are so, *theorically proved propositions*.

* *θεωρημάτιον* is entered in L. & S., with a reference to the Diatribes of Epictetus.

I wish a historical study were made of all the remarkable theoric steps and noticeable classes of theoric steps. I do not mean a mere narrative, but a critical examination of just what and of what mode the logical efficacy of the different steps has been. Then, upon this work as a foundation, should be erected a logical classification of theoric steps; and this should be crowned with a new methodeutic of necessary reasoning. My future years,—whatever can have become of them, they do not seem so many now as they used, when, at De Morgan's *Open Sesame*, the Aladdin matmûrah of relative logic had been nearly opened to my mind's eye;—but the remains of them shall, I hope, somehow contribute toward setting such an enterprise on foot. I shall not be so short-sighted as to expect any cut-and-dried rules nor yet any higher sort of contrivance, to supersede in the least that ἀγχίνοια,—that penetrating glance at a problem that directs the mathematician to take his stand at the point from which it may be most advantageously viewed. But I do think that that faculty may be taught to nourish and strengthen itself, and to acquire a skill in fulfilling its office with less of random casting about than it as yet can.

Euclid always begins his presentation of a theorem by a statement of it in *general terms*, which is the form of statement most convenient for applying it. This was called the πρότασις, or *proposition*. To this he invariably appends, by a λέγω, "I say," a translation of it into *singular terms*, each general subject being replaced by a Greek letter that serves as the proper name for a single one of the objects denoted by that general subject. Yet the generality of the statement is not lost nor reduced, since the understanding is that the letter may be regarded as the name of any one of those objects that the student may select. This second statement was called the ἔκθεσις, or *exposition*. Euclid lived at a time when the surpassing importance of Aristotle's *Analytics* was not appreciated. The use, probably by Euclid himself, of the term πρότασις, which in Aristotle's writings means a premiss, to denote the conclusion to be proved, illustrates this, and confirms other reasons for thinking that Euclid was unacquainted with the doctrine of the *Analytics*. The invariable appending by Euclid of an ἔκθεσις to the πρότασις (except in a few cases in which the proposition is expressed in the ecthetic form alone,) inclines me to think that it was, for him, a principle of logic that any general proposition can be so stated; and such a form of statement was always convenient in demonstration; sometimes, necessary. If this surmise be correct, Euclid

probably looked upon the function of the ἔκθεσις as that of merely supplying a more convenient form for expressing no more than the πρότασις had already asserted. Yet inasmuch as the πρότασις does not mention those proper names consisting of single letters, the ἔκθεσις certainly does supply ideas that, however obvious they be, are not contained in the πρότασις; so that it must be regarded as taking a little theoric step. The principal theoric step of the demonstration is, however, taken in what immediately follows; namely, in "preparation" for the demonstration, the παρασκευή, usually translated "the construction." The Greek word is applied to any thing got up with some elaboration with a view to its being used in any contemplated undertaking: a near equivalent to a frequent use of it is " apparatus." Euclid's παρασκευή consists of precise directions for drawing certain lines, rarely for spreading out surfaces; for though his work entitled "*Elements*," appears to have been intended as an introduction to theoretical mathematics in general, (the art of computation being the *métier*, —the 'mister, as Chaucer would say, of the Pythagoreans,) yet Euclid always conceives arithmetical quantities,—even when distinguishing between prime and composite integers,—as being lengths of lines. It was his mania. Those lines which are drawn in the παρασκευή are not only all that are referred to in the condition of the proposition, but also all the additional lines which he is about to consider in order to facilitate the demonstration of which this παρασκευή is thus the soul, since in it the principal theoric step is taken. But the construction of these additional lines is introduced by γάρ, here meaning "for," and sometimes the text does not very sharply separate some parts of the παρασκευή from the next step, the ἀπόδειξις, or demonstration. This latter contains mere corollarial reasoning, though, in consequence of its silently assuming the truth of all that has been previously proved or postulated (which Mr. Gow, in his *Short History of Greek Mathematics*, gives as the reason for Euclid's having called his work Στοίχεια; which seems to me very dubious,) this corollarial reasoning will sometimes be a little puzzling to a student who has not so thoroughly assimilated what went before as to have the approximate proposition ready to his mind. After this, a sentence always using ἄρα, "hence," "*ergo*," repeats the πρότασις (not often the ἔκθεσις,) so as to impress the proposition on the mind of the student, in its new light and new authority, expressed in the form most convenient in future applications of it. This is called συμπέρασμα, the "conclusion," which sounds highly Aristotelian. Yet the classical use of

the verb to signify coming to a final conclusion, rendered this noun inevitable as soon as these neuter abstracts came into the frequent use that they had by Euclid's time. The conclusion always ends with the words ὅπερ ἔδει δεῖξαι, "which had to be shown," *quod erat demonstrandum*, for which Q. E. D. is now put.

I will take at random the 20th proposition of the first book, to illustrate the matter. "In every triangle, any two sides, taken together are always greater than the third.

"For let ΑΒΓ be a triangle. I say that any two sides taken together are greater than the third; ΒΑ and ΑΓ than ΒΓ, ΑΒ and ΒΓ than ΑΓ, and ΒΓ and ΓΑ than ΑΒ.

"For extend ΒΑ to the point Δ, taking ΑΔ equal to ΓΑ, [which he has shown in the 2d proposition always to be possible;] and join Δ to Γ by a straight line.

"Now since ΔΑ is equal to ΑΓ, the angle under ΑΔΓ is equal to that under ΑΓΔ [by the *pons asinorum*,] Hence, the angle under ΒΓΔ will be greater than that under ΑΔΓ. [This is a fallacy of a kind to which Euclid is subject from assuming that every figure drawn according to the παρασκευή will necessarily have its parts related in the same way, when it can only be otherwise if space is finite, which he has never formally adopted as a postulate. In the present case, if ΑΔ is more than half-way round space, the triangle ΑΓΔ will include the triangle ΑΒΓ within it; and then the angle ΒΓΔ will be less than the angle ΑΔΓ.] And since ΔΓΒ is a triangle having the angle under ΒΓΔ greater than that under ΒΔΓ, but the greater side subtends under the greater angle [which is the theorem that had just previously been demonstrated,] therefore ΔΒ is greater than ΒΓ. But ΔΑ is equal to ΑΓ. Therefore, ΒΔ and ΑΓ are greater than ΒΓ. Similarly, we shall [i. e. could] show that ΑΒ and ΒΓ are greater than ΓΑ, and ΒΓ and ΓΑ than ΑΒ.

"In every triangle, then, any two sides joined together are greater than the third, which is what had to be shown."

I will now return to the consideration of cyclical systems, and will begin by expressing my definition of such a system in those Existential Graphs which have been explained in *The Monist* (Vol. XVI, pp. 524–544, where correct the errata given in Vol. XVII. p. 160). In reference to those graphs, it is to be borne in mind that they have not been contrived with a view to being used as a calculus, but on the contrary for a purpose opposed to that. Nevertheless, if any one cares to amuse himself by drawing inferences by machinery, the graphs can be put to this work, and will perform

it with a facility about equal to that of my universal algebra of logic and as much beyond that of my algebra of dyadic relatives, of which the lamented Schroeder was so much enamoured. The only other contrivances for the purpose appear to me to be of inferior value, unless it be considered worth while to bring a pasigraphy into use. Such ridiculously exaggerated claims have been made for Peano's system, though not, so far as I am aware, by its author, that I shall prefer to refrain from expressing my opinion of its value. I will only say that if a person chooses to use the graphs to work out difficult inferences with expedition, he must devote some hours daily for a week or two to practice with it; and the most efficacious, instructive, and entertaining practice possible will be gained in working out his own method of using the graphs for his purpose. I will just give these little hints. Some slight shading with a blue pencil of the oddly enclosed areas will conduce to clearness. Abbreviate the parts of the graph that do not concern

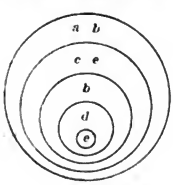


Fig. 7.

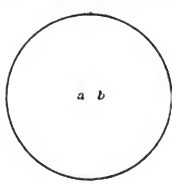


Fig. 8.

your work. Extend the rule of iteration and deiteration, by means of a few theorems which you will readily discover. Do not forget that useful iteration is almost always into an evenly enclosed area, while useful deiteration is, as usually, from an oddly enclosed area. Perform the iteration and the immediately following deiteration at one stroke, in your mind's eye. Do not forget that the ligatures may be considered as graph-instances scribed in the areas where their least enclosed parts lie, and repeated at their attachments. Their intermediate parts may be disregarded. Reflect well on each of the four permissions (especially that curious fourth one,) until you vividly comprehend the why and wherefore of each, and the bearings of each from every point of view that is habitual with you. Do not forget that an enclosure upon whose area there is a vacant cut can everywhere be inserted and erased, while an unenclosed vacant cut declares your initial assumption, first scribed, to have been absurd. You will thus, for example, be enabled to see at a

glance that from Fig. 7 can be inferred Fig. 8. The cuts perform two functions; that of denial and that of determining the order of selection of the individual objects denoted by the ligatures. If the outer cuts of any graph form a nest with no spot except in its innermost area, then all that part of the assertion that is therein expressed will need no nest of cuts, but only cuts outside of one another, none of them containing a cut with more than a single spot on it. It will seldom be advisable to apply this to a complicated case, owing to the great number of cuts required; but you should discover and stow away in some sentry-box of your mind whence the beck of any occasion may instantly summon it, the simple rule that expresses all possible complications of this principle. As an example of one of the simplest cases, Fig. 9 and Fig. 10 are seen precisely equivalent.

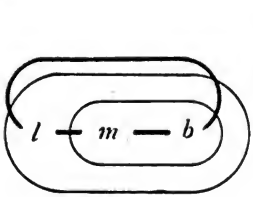


Fig. 9.

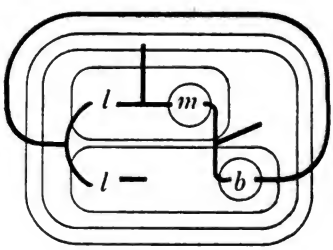


Fig. 10.

Owing to my Existential Graphs having been invented in January of 1897 and not published until October, 1906, it slipped my mind to remark when I finally did print a description of it, what any reader of the volume entitled *Studies in Logic by Members of the Johns Hopkins University*, (Boston: 1882,) might perceive, that in constructing it, I profited by entirely original ideas both of Mrs. and Mr. Fabian Franklin, as well as by a careful study of the remarkable work of O. E. Mitchell, whose early demise the world of exact logic has reason deeply to deplore.

My reason for expressing the definition of a cyclic system in Existential Graphs is that if one learns to think of relations in the forms of those graphs, one gets the most distinct and ecthetically as well as otherwise intellectually, iconic conception of them likely to suggest circumstances of theoric utility, that one can obtain in any way. The aid that the system of graphs thus affords to the process

of logical analysis, by virtue of its own analytical purity, is surprisingly great, and reaches further than one would dream. Taught to boys and girls before grammar, to the point of thorough familiarization, it would aid them through all their lives. For there are few important questions that the analysis of ideas does not help to answer. The theoretical value of the graphs, too, depends on this.

Strictly speaking, the term 'definition' has two senses,—Firstly, this term is sometimes quite accurately applied to the composite of characters which are requisite and sufficient to express the signification of the 'definitum,' or predicate defined; but I will distinguish the definition in this sense by calling it the 'definition-term.' Secondly, the word definition is correctly applied to the double assertion that the definition-term's being true of any conceivable object would always be both requisite and sufficient to justify predicating the definitum of that object. I will distinguish the definition in this sense by calling it the 'definition-assertion-pair.' In the present case, as in most cases, it is needless and would be inconvenient to express the entire definition-assertion-pair with strict accuracy, since we only want the definition in order to prove certain existential facts of subjects of which we *assume* that the definitum, 'cyclic-system,' is predicable. We do not care to *prove* that it is predicable, and therefore the assertion that the definitum is predicable of the definition-term is not relevant to our purpose. In the second place, we do not care to meddle with that universe of concepts with which the definition deals; and it would considerably complicate our premisses to no purpose to introduce it. We only care for the predication of the definition-term concerning the definitum so far as it can concern existential facts. All that we care to express in our graph is so much as may be required to deduce every existential fact implied in the existence of a cyclic system.

A cyclic system is a system; and a system is a collection having a regular relation between its members. One member suffices to make a collection, and is requisite to the existence of the collection. The definition, so far as we need it, is then expressed in the graph of Fig. 11. Here K with a "peg" (See *Monist*, Vol. XVI, p. 530) at the side asserts that the object denoted by the peg is a cyclic system. The letter M with one peg at the top and another placed on either side without any distinction of meaning, asserts that the object denoted by the side-peg is a *member* of the system denoted by the top-peg. The letter C, with a peg at the top and another at the side asserts that the object denoted by the top-peg is a relation

involved in that relation between all the members which constitutes the entire collection of them as the system that it is, and asserts that the object denoted by the side-peg is such a system. The Roman numerals each having one peg placed at the top or bottom of the numeral and a number of side-pegs equal to the value of the numeral, all these side-pegs being carefully distinguished, is used to express the truth of the proposition resulting from filling the blanks of the rheme denoted by the top or bottom peg, with indefinite signs of objects denoted by the side-pegs taken in their order, all the left-hand pegs being understood to precede all the right-hand pegs, and on each side a higher peg to precede a lower one. With this understanding, the graph of Fig. 11, where for the sake of perspicuity the oddly enclosed, or negating areas are shaded, may be translated into the language of speech in either of the two following equivalent forms (besides many others):

It is false that
there is a cyclic system while it is false that
this system has a member
and involves a relation ("being A to," the bottom peg of II,)
and that it is false that
the system has a member of which it is false that
it is in that relation, A, to a member of the system,
while it is false that
there is a definite predicate, P, (the top or bottom peg of I,) that is true of a member of
the system and is false of a member of the system, and
that it is false that
this predicate is true of a member of the system of which
it is false that
it is A to a member of the system of which P is true.

This more analytic statement is equivalent to saying that every cyclic system (if there be any,) has a member, and involves a relation called "being A to" (not the graph but perspicuity of speech requires it to be so named,) such that every member of the system is A to a member of the system, and any definite predicate, P, whatsoever, that is at once true of one member of the system and untrue of another is true of some member of the system that is not A to any member of which P is true.

To anybody who has no notion of logic this may seem a queer attempt to explain what is meant by a cyclic system; and it is true that it would be a needlessly involved *verbal* definition; a verbal

definition being an explanation of the meaning of a word or phrase intended for a person to whose mind the idea expressed is perfectly distinct. But it is not intended to serve as a *verbal*, but as a *real* definition, that is, to explain to a person to whom the idea may be familiar enough, but who has never picked it to pieces and marked its structure, exactly how the idea is composed. As such, I believe it to be the simplest and most straight-forward explanation possible. When you say that the days of the week "come round in a set of seven," you think of the week everything here expressed of K. I do not mean that all this is *actually* existent in your thought; for thinking no more needs the actual presence in the mind of what is

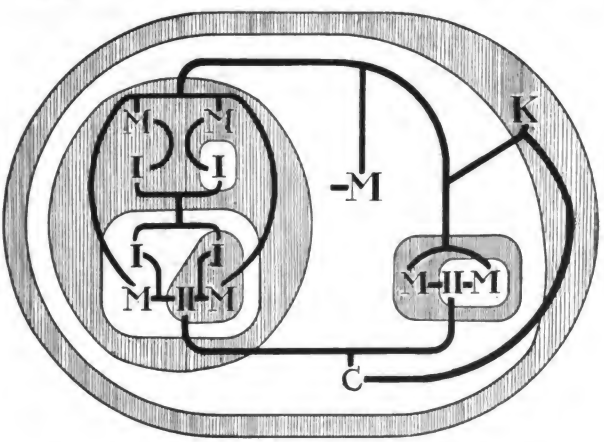


Fig. 11.

thought than knowing the English language means that at every instant while one knows it the whole dictionary is actually present to his mind. Indeed, thinking, if possible, even *less* implies presence to the mind than knowing does; for it is tolerably certain that a mind to whom a word is present with a sense of familiarity knows that word; whereas a mind which being asked to *think* of anything, say a locomotive, simply calls up an image of a locomotive has, in all probability, by bad training, pretty nearly lost the power of thinking; for really to think of the locomotive means to put oneself in readiness to attach to it any of its essential characters that there

may be occasion to consider; and this must be done by general signs, not by an image of the object. But the truth of the matter will more fully be brought out as we proceed.

All that we require of the definition may be put into a simpler shape by omitting the letter M, since the interpreter of the graph must well understand that the whole talk of the graphist for the time being, so far as it refers to things and not to the attributes or relations, has reference to the members of a cyclic system. We may consequently use the graph of Fig. 12 in place of Fig. 11.

It will be remarked that the graph of Fig. 12 is no more a definition of a cyclic system than it is of the relation of immediate antecedence; and this is as it should be; for plainly a system cannot

Fig. 12

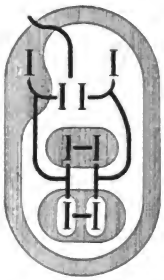


Fig. 13.

be defined, without virtually defining the relation between its members that constitutes it a system.

I will now begin by drawing one of several corollaries that are right at my hand. I am always using the words '*corollary*' and *theorem* in the strict sense of the foregoing definition. This corollary results from the logical principle that to every predicate there is a negative predicate which is true if the former is false, and is false if the former is true. This purely logical principle is expressed in the graph of Fig. 13. Obviously, if any predicate is both true of some member and false of some member of the system, the same will be the case with its negative. Consequently, by the definition, this negative will be true of some member without being true of any to which that member is A; or, in other words, the original

predicate will be false of some member without being A to any member of which it is false. Thus, if any predicate is neither true of all nor false of all the members of any cyclic system, but is true of some one and false of some other, there will be two different members of one of which it is true without being true of any to which that member is A, while of the other it is false without being false of any to which that member is A. Or, to put the corollary in a different light, taking any predicate, P, whatsoever, then, in case you can prove that there cannot be more than one exception to the rule that every member of the system resembles some one of those to which it is A in respect to the truth or falsity concerning it of P, then if P be true of one member, it is true of all, and if it be false of one, it is false of all.

I am now going to apply this proposition to a theoric proof of a proposition which is really only a corollary from the definition of a cyclic system. My motive for this departure from good method is that it will afford a good illustration of the advantage of making the selected predicate, P, as special and characteristic of the state of things you are reasoning about as possible. The proposition I am going to prove is, that in any cyclic system that contains more than one member no member will be A to itself. For this purpose I will consider any member of the system you please, and will give it the proper name, N. This ecthetic step is already theoric, but is a matter of course. Another theoric step, not a matter of course, shall consist in my selecting, as the predicate to be considered, "is N." Now if N is A to itself, every member of the system of which this predicate is true (which can be none other than N itself,) will be A to a member of which the predicate is also true; and consequently, by the definition of a cyclic system this predicate cannot be true of one member and false of another. But if there be any other member of the system than N, it will be false of that one. Whence, if N were A to itself and were not the only member of the system, there would be no member of which it would be true that it was N. But by the definition, every cyclic system has some member, and N was chosen as such. So that it must be, either that the system has no other member, or that any member you please, and consequently *every one*, is non-A to itself.

Now what I wanted to point out was that if instead of "is N," I had selected, as my predicate to be considered, "is A to itself," it would merely have followed that since any member that is A to

itself is A to a member that is A to itself, by the general definition either every member of the system is A to itself or none is so.

I will now prove that this proposition that no member of a cyclical system is A to itself unless it is the only member of the system is not a theorem, in any strict sense, by proving it corollarially. For this purpose I first prove that no cyclical system, by virtue of the same relation A, involves another as a part, but not the whole of it. For suppose that certain members of a cyclical system form by themselves a cyclical system constituted by the same A-hood. Then, by the part of the definition of a cyclical system that has been expressed as graph in Fig. 11 and in Fig. 12, there is a member of this minor system; and every member of it is A to a member of the major system that is a member of the minor system. Hence, by that same partial definition, the predicate "is a member of the minor system" being true of one is true of all members of the major system. The minor system is, then, the whole of the major system. To go further, I must employ that assertion of the definitum "is a cyclic system" concerning the definition-term, which assertion has not been expressed as a graph, in order to prove, by its conformity with the definition that a single object, having a relation, identity, to itself, that relation conforming to the conditions of the constitutive relation of a cyclical system, must be admitted to be a cyclical system of a single member. If, therefore, one of the members of a cyclical system of more than one member were A to itself, it would be a cyclical system which was a part but not the whole of another cyclical system, which we have seen to be impossible.

I shall now employ the first corollary to prove that every member of a cyclical system is A'd by some member. For take any member you please of any such system you please; and I will assign to it the proper name N. If then N is the only member of the system, by the definition N is A to itself. But if there be another member, it is one of which the predicate "is N" is not true, though there is some member, namely N, of which that predicate is true. Consequently, by that first corollary, there must be a member of which it is not true that it is N which is A to nothing of which this is not true. But, by the definition, every member of a cyclic system is A to some member; and therefore that member which is not A to any member of which "is N" is not true, must be true of a member of which "is N" is true, which, by hypothesis, is only N itself: consequently any member of any cyclic system which one may choose

to select is A'd by some member, and by another than itself, if there be another. Q. E. D.

Further investigation of the properties of cyclic systems will need a somewhat more recondite theoric step. Certainly, however, I must not convey the idea that I claim to be quite sure of this. As yet, I have not sufficiently studied the methodeutic of theorematic reasoning. I only have an indistinct apprehension of a principle which seems to me to prove what I say; and I must confess that of all logical habits that of confiding in deductions from vague conceptions is quite the most vicious, since it is just such reasonings that to the intellectual rabble are the most convincing; so that the conclusions get woven into the general common-sense so closely, that it at length seems paradoxical and absurd to deny them, and men of "good sense" cling to them long after they have been clearly disproved. However, whether it be absolutely necessary or not, the only way I see, at present, of demonstrating the remaining properties of a cyclic system is to suppose a predicate to be formed by a process which will seem somewhat complicated. I shall not state what this predicate is, but only suppose it to be formed according to a rule; and even this rule will not be exactly stated but only a description of its provisions will be given. I shall suppose that one member of the system is selected by the rule as one of the class of subjects of which the predicate is true, and that the remaining members of this class shall be taken into it from among the members of the system *one by one*, according to the rule that when the member last taken in is not A to any member already taken in, one and one only of the members of the system not yet taken in to which that last adopted member is A is to be added to the class; and this new addition may, in the same way, require another. If the system were infinite (as we shall soon see that it cannot be,) this might go on endlessly; and so far, we have not seen that this cannot happen. But as soon as it happens that the member last admitted to the class is A to a member already admitted (and consequently that every member admitted to the class is A to an admitted member) the admissions to the class are to be brought to a stop. There are now two supposable cases to be provided for which we shall later find will never occur; but if we did not determine what was to be done if they should (this not being proved impossible) our first proof would involve a *petitio principii*. One is the case in which the finally adopted member is A to a member already having an A that had previously been admitted to the class. The other is

the case in which the last (but not necessarily the final) adopted member is not only A'd by the *last previously* adopted member (for the sake of providing which with a member A'd by it, the very last was taken in) but is also A'd by an earlier adopted member. In the latter case, in which the member last adopted, which we may name V, is not only A'd by the last previous one, which we may name U, but is also A'd by a previously adopted member of the class which we may name K, we are to reject from the class all that were admitted after K to U inclusive; so that we revert to what would have been the case, as it might have been, if next after K we had admitted V, to which K is A. We should thus make the class smaller, which we shall soon see could not happen. In the other case, where the last adopted member, which we will name, Z, is A to a previously adopted one, which we will name J, which was not the first member adopted into the class, but is A'd by another, which we will name I, we reject from the class both I and all that were adopted previously to I.

After these suppositious rejections, there is no object of which the predicate, "is a member of the class so formed," is true that is not A of any object of which the same predicate is true, and therefore, by the definition so often appealed to, this predicate cannot be both true of a member of the cyclic system and false of another such member. Now it plainly is true of some member, since the first object taken into it as well as every one subsequently taken into it were members of the cyclic system. Therefore, this predicate cannot be false of any member of the cyclic system. In other words, the class so formed includes all the members of the cyclic system. Consequently, there cannot have been any rejections.

Since there were no rejections, the first member adopted must remain a member of the class; and since we have seen in a former corollary that every member of a cyclic system is A'd by a member of the same system, this first adopted member must be A'd by some member of the system, that is, by some member of the class. But by the rule of formation of the class no member of it except the finally adopted one can be A to a previously adopted member. It follows that there must be a finally adopted one; and by the same rule no member of the class except the first was adopted without there being a *last previously adopted* member. It follows that the succession of adoptions cannot, at any part of it, have been endless. This is one of the most difficult theorems that I had to prove.

Moreover, every member of the class is by the mode of forma-

tion A to one, and only to one, member of the class; and consequently the same is true of all the members of every cyclic system.

Moreover, every member of the class except the first was only taken in so as to be A'd by the last, or, at any rate, by one member only; and the first adopted member as we have seen is A'd by the finally adopted member. It cannot be A'd by any other, since by the rule of formation, such another would thereby have become the finally adopted member. Hence, no member of a cyclic system is A'd (in the same sense) by any two members of the system; or no two members are A to the same member.

I have thus, by means of this *θεωρία* of the formation of a certain kind of class, succeeded in demonstrating, what one might well have doubted, that from the proposition expressed in Fig. 11 follows the double uniqueness of the cyclical relation of A-hood or immediate antecedence. This is the principal, as I think, of those properties that are common and peculiar to cyclical systems. The same theoric step, or a reduplication of it, will enable the reader to prove other properties, common but not peculiar to cyclic systems; and especially that a collection the count of whose members in one order comes to an end can never in any order involve an endless process, whether it comes to an end or does not. There is, by the way, an important logical interest in that mode of succession in which an endless succession, say, of odd numbers, is followed by a beginningless diminishing succession of even numbers. For it shows that two classes of objects may have such a connection with a transitive relation, such as are those of causation, logical implication, etc., that any member of either class is *immediately* in this relation only to a member of the same class, while yet every member of one of the classes may be in this same relation to every member of the other class. Thus, it may be that thought only acts upon thought *immediately*, and matter *immediately* only upon matter; and yet it may be that thought acts on matter and matter upon thought, as in fact is plainly the case, somehow.

In this theoric step, it is noticeable that I have had to embody the idea of *antecedence* generally, in order to prove the properties of cyclical *immediate antecedence*. Any reasoner is always entitled to assume that the mind to which he makes appeal is familiar with the properties of antecedence in general: since if he were not so, he could not even understand what reasoning was at all about. For logical antecedence is an idea which no reasoner can unload or dis-

pense with. It would have been easy to replace, in my demonstrations, all the "previously"s etc. by relations of inference. I have not done so in order not to burden the reader's mind with needlessly intricate forms of thought.

A corollary from what has already been proved is that if we regard the definition of Fig. 12 as the definition of A-hood, or cyclical immediate antecedence, then A-hood is not a single relation but is any one of a class of relations which, if the collection of all the members of the system is not very small, is a large class. For taking any two members of the system, and naming them Y and Y, we may form such a relation, that of A'-hood, that whatever is neither Y nor Y, nor is A to Y nor to Y is A' to whatever is A'd by it, while whatever is A to Y is A' to Y, whatever is A to Y is A' to Y, whatever is A'd by Y is A"d by Y, and whatever is A'd by Y is A"d by Y; and then A' will have the same general properties as A. Thus, if the number of members of a cyclic system is m, the number of relations of A-hood is $(m-1)!$ If m be seven, the number of A-relations is 720; etc.

There is no relation in a cyclic system exactly answering to general antecedence in a denumeral* system.

As a finitude is a positive complication (as is shown by a form of inference being valid in a finite system that is not elsewhere valid,) so in place of the relation of betweenness which in a linear system endless both ways, which, if those ways are not distinctively characterized, is triadic, we have in a cyclic system a tetradic relation expressible by α with four tails, so that Fig. 14, which means that an object which can, wherever it be in the cycle, pass from its position to that which is *next* to that position, being either A to it or A'd by it, will if at I be *opposite* to an object at J, relatively to any objects at U and at V. That is, such an object cannot move from I to J without passing through U and V. This implies that U is opposite to V relatively to I and J; that no other pair out of the four are opposite to each other relatively to the other pair; and that that way of passing round the cycle in which U is reached next after I is the way in which J is reached next after U, V next after J, and I next after V; while that way in which V is reached next after I is the way in which J is reached next after V, U next after J, and I next after U. This supposes that I, J, U, and V are all different, as those that are opposite must be unless two that are

* See Note at the end of the article.

adjacent are identical, in which case we may understand the relation as always being true and meaningless.

We may modify this relation, so as to render it exact, by de-

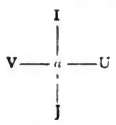


Fig. 14.

Fig. 15.

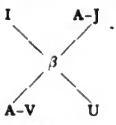


Fig. 16.

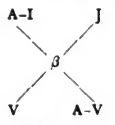


Fig. 17.

fining Fig. 15 as true, if I and J are identical while U and V are also identical; or if I and U are identical while J and V are identical, and also if Fig. 16 or Fig. 17 is true; but as not true unless necessarily so according to these principles. This last clause, by the way, has a very important logical form; but I shall not stop to comment upon it.

It will be observed that if Fig. 15 is true, then one or other of the graphs of Fig. 18 must be true. And if two α-relations hold,

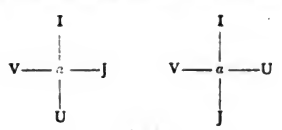


Fig. 18.

having three of their four correlates identical, and not the same pair being opposite in both, then two α-conclusions may be drawn in which the two correlates that only appeared once each in the premis-

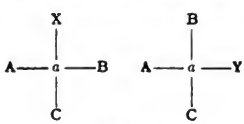


Fig. 19.

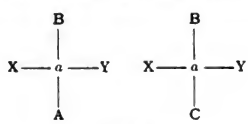


Fig. 20.

ses, appear together, and opposite to one another. Thus, from Fig. 19 may be inferred Fig. 20. The β-relation lends itself to much further inferential procedure. In the first place in Fig. 15, the whole graph may be turned round on the paper so as to bring each correlate into the place of its opposite. It may also be turned through 180° round a vertical axis in the sheet. [It may consequently be turned 180° round a horizontal axis in the sheet.] Moreover, the

two correlates on the left, I and V, may be interchanged. [And so, consequently may J and U.] Moreover, from Fig. 21, we can infer Fig. 22. [Whence it follows that from Fig. 23 we can infer Fig

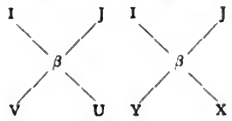


Fig. 21.

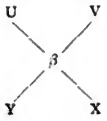


Fig. 22.

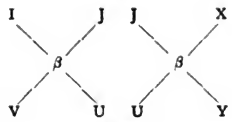


Fig. 23.

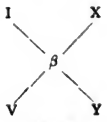


Fig. 24.

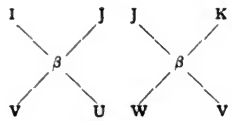


Fig. 25.

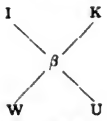


Fig. 26.

24.] Also, from Fig. 25 we can infer Fig. 26. Whence there follow very obviously several transformations. For example, Fig. 27 will be true; and if any three of the four graphs of Fig. 28 are true, so is the other one. It is obvious that the relation β involves cyclical

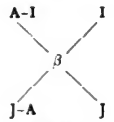


Fig. 27.

addition-subtraction, by its definition. Cyclic arithmetic involves no other *ordinal*, or climacote, numbers than cyclic ordinals. But if we define a *cardinal* number as an adjective essentially applicable, universally and exclusively, to a plural of a single multitude, then even the relations α and β may be said to depend upon the value of a cardinal number; namely, upon the modulus of the cycle; and no cardinal number is cyclic. Dedekind and others consider the

pure abstract integers to be ordinal; and in my opinion they are not only right, but might extend the assertion to all real numbers. [But what I mean by an ordinal number precisely must be explained further on.] Nevertheless, the operations of addition, mul-

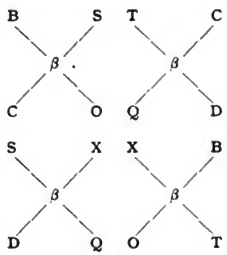


Fig. 28.

tiplication, and involution can be more simply defined if they are regarded as applied to cardinals, that is to multitudes, than if they are regarded in their application to ordinals.

Thus, the sum of two multitudes, M and N, is simply the multitude of a collection composed of the mutually exclusive collections of the multitudes M and N. The ordinal definition, on the other hand, must be that 0+X=X, whatever X may be, while (the ordinal next after Y)+X is the ordinal next after (Y+X). So the product of two multitudes M and N, is simply the multitude of units each composed of a unit of a collection of multitude M and a unit of multitude N; while the ordinal definition must be that 0×0=0 and that X×(the ordinal next after Y) is X+(X·Y) and the ordinal next after X×Y is (X·Y)+Y. So finally the multitude M raised to the power whose exponent is N, is the multitude of ways in which every member of a collection of multitude N can be related in a given

Fig. 29.

way, each to some single member or other of a collection of multitude M. Thus $3^2=9$ because the different configurations of Fig. 29 are

nine in number; while $2^3=8$ because the different configurations of Fig. 30 are eight in number. But a definition of involution which

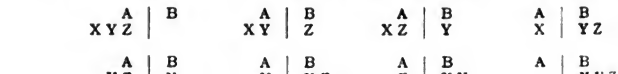


Fig. 30.

shall be *purely* ordinal must be quite a complicated affair. We may say, for example, that $X^1=X$ and $X^{1+Y}=X \cdot X^Y$.

In cyclic addition, that is, in the α and β relations, there is but a single cardinal number to be dealt with; and this is fully dealt with in counting round and round the single cycle. But in multiplication there is always another cycle, and thus another cardinal number to be considered, although the modulus of the second cycle is usually such that it is not brought to our attention. But suppose that in a cycle of 72 we multiply the successive integers from zero up by 54. The following will be the result:

$$0 \times 54 = 0 = 72$$
$$1 \times 54 = 54 = -18$$
$$2 \times 54 = 36$$
$$3 \times 54 = 18$$
$$4 \times 54 = 72 = 0$$

It will be seen that there is a cycle of modulus 4. Suppose that, instead of 54, we take 27 as the multiplicand. Then we shall have

$$0 \times 27 = 0 = 72$$
$$1 \times 27 = 27$$
$$2 \times 27 = 54 = -18$$
$$3 \times 27 = 9$$
$$4 \times 27 = 36$$
$$5 \times 27 = 63 = -9$$
$$6 \times 27 = 18$$
$$7 \times 27 = 45 = -27$$
$$8 \times 27 = 72 = 0$$

By halving the multiplicand we have doubled the modulus. Suppose, however, that, instead of $\frac{1}{2}\times 54$, we take $\frac{1}{3}54=18$, as the multiplicand. Read the column of successive multiples of 54 upwards, and we shall see that the multiples of 18 have a cycle of modulus 4.

With 6 as the multiplicand we get a cycle of 12 for its multiples, the numbers being as follows:

6, 12, 18, 24, 30, 36, −30, −24, −18, −12, −6, 0

With 2×6 we get a cycle of ½12, every other one. With 4×6 as multiplicand, we get a cycle of ⅓12=3, with 8×12 as multiplicand, since 3 cannot be halved we still get 3. With $3 \cdot 6=18$ as multiplicand, we get a cycle of ⅓×12, or every third of the multiples of 6, but with $3 \cdot 18=54$ as modulus, since 4 is not divisible by 3, we still get a cycle of 4. With $6 \cdot 6=36$ as multiplicand, we get every sixth multiple of 6, or two in all, 0 and 36. With 5×6, 7×6, and 11×6 since 12 is not divisible by 5, 7, or 11, we still get a modulus of 12. With 30, the order is as follows:

0, 30, –12, 18, –24, 6, 36, –6, 24, –18, 12, –30, 0.

This principle is obvious: if the multiples of a number N form a cycle of modulus K, and p is a prime number, then the multiples of pN will form a cycle of K/p, provided K is divisible by p; but otherwise, the modulus will remain K. Suppose, then, that the cycle of multiples of 1, that is to say, the cycle of our entire system of numbers is $p^a \cdot q^b$, where p and q are primes, and a and b are any whole numbers. If, then, we multiply 1 by $r^c \cdot s^d \cdot t^e$, where r, s, t are other primes than p and q, the modulus of the cycle of multiples of $r^c \cdot s^d \cdot t^e$ will remain $p^a \cdot q^b$. But every time we multiply this by p we divide the modulus by p, until we have so multiplied it a times. On the other hand, if, instead of multiplying 1 by $r^c \cdot s^d \cdot t^e$, we multiply it by $p^a \cdot q^b$ to get a new multiplicand, the modulus of the cycle of multiples of $p^a \cdot q^b$ will be 1; that is, all multiples will be equal. It will follow by the distributive principle, that $p^a \cdot q^b$ added to any number leaves that number unchanged. That is to say, the modulus of a cycle is the *zero* of that cycle. But right here I must explain what I mean by an *ordinal number*.

Take any enumerable, or finite, collection of distinct objects. Let there be recognized one special relation in which each of them stands to a single one of them, and no two to the same one, and such that any predicate whatsoever that is true of any one of them and is true of the one to which any one of which it is true stands in that relation, is true of all of them. This substantially defines that relation as the relation of "being A'd by." Thereby, that collection is recognized as forming a cyclical system of which those objects are members. But those objects will not in general be numbers of any kind. They may be days of the week or certain meridians of the Globe. But now consider a single "step," or substitution, by which the A of any member of the cyclic system is replaced by the member itself. From what member this step, or substitution began remains indefinite. The "step" still leads to a single

member, and the step is a single kind of step even if that member be any member you please, in which case it is not a single, i. e. a singular, but the general member. I will condescend to meet the reader's probably indurated habit of crass nominalist thought by saying that, in the one case, it is a single member not definitely described, and in the other is a single member, left to him to choose; and there is no objection to this, if the member be supposed to be both existent and intelligible, both of which however it need not be. Give this kind of a step a proper name. Next consider in succession all the kinds of step each of which consists in first taking a step of the last previously considered kind and then substituting for the member which it puts in place of another, the member of which that member is A; so that the kinds of steps may be

From the A of a member to that member,
From the A of the A of a member to that member,
From the A of the A of the A of a member to that member,
etc. etc.

Now if each of these has a name, whether pronounced, scribed, or merely thought, those names will come round in a cycle of the same modulus as the original system. They will therefore form a cyclic system, but not a system of objects not essentially ordered, as the original system may have been. This system of names is a cyclic system of numbers. These are ordinal, or climacote, numbers. By ordinal numbers in general I mean names essentially denoting kinds of steps each from any member whatever of a system of objects to, at most, a single object of the system, (i. e., one or another object, depending on what object the step replaces by this other). Thus, as I use the term "ordinal number" I do not mean the absolute first, second, third, etc. member of a row of objects, but rather such as these: the same as, the first after, the second after, the third before, etc. These numbers are certainly "ordinal" in the sense of expressing relative order; yet it might be better to avoid possible misunderstanding by calling them *metrical numbers,* or more specifically, *climacode* or *climacote numbers.*

In order to push further our study of this subject, let us suppose a pack of 72 cards, numbered in order upon their faces, to be dealt into two piles. We will not directly consider those serial face-values, but only their differences. The two piles cannot regularly be reunited, because the difference of successive face-values in each, comes round in a cycle in each pile, the bottom card of the one pile, 1, being 2 more than the top card 71 (counting round the cycle of

modulus 72) and that of the other pile also coming round in a cycle. The difference between the face-values of any two cards in either pile is a multiple of 2, the multiplier being the difference of position in that pile. If now we desire so to re-deal the cards of the one pile and the other into any number n of piles, as to produce the same effect as if they had originally been dealt into $2n$ piles, we must first deal the first pile leaving room between every two of the new piles for the piles to be produced by dealing the second pile. If for the number, n, we take 8, we shall get sixteen piles, the first 8 of 5 cards each and the last 5 of 4; and now it is allowable and proper to place each of the first 8 piles on the pile 8 piles further advanced; or equally so to place each of the last 8 piles on the pile 8 piles further advanced, counting round and round the cycle of modulus 16. In either case the cards of each composite pile so formed will form a cycle, successive face-values increasing (round and round the cycle of 72) by 16. The rule for gathering the piles is just the same as that previously given, except that one must confine oneself to piles *of the same set*. For instance if 72 cards, numbered as just described, get in any way dealt into 15 piles, the top cards of the piles will have these values:

61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 58, 59, 60

Now since 15|72=3 these are in 5 sets of 3 piles, thus

61, 64, 67, 70, 58,
62, 65, 68, 71, 59,
63, 66, 69, 72, 60.

We shall therefore put the pile headed by 72 on the pile headed by 69, because there is only one pile of the set to the right of the former, and these on the pile headed by 66, and these on that headed by 63, and finally all four on the one headed by 60. So we shall in the next set begin with the pile headed by 71, the last of the larger piles.

We shall thus get the whole pack divided into three portions, and there is absolutely no way of getting them back into a single pack except by *undealing* them, that is by cutting the cards one by one from the three portions in turn, round and round.

This general rule holds in all cases; as much when the entire number of cards is prime as when it is composite. For a prime number is one whose greatest common divisor with any smaller positive integer is 1, while, of course, like any other number, its greatest divisor common to itself is itself.

Having thus fully explained the dealing into any number of

piles of any number of cards, prime or composite, I revert, after this almost interminable disquisition, to the subject of cyclic logarithms. I have confined, and shall continue to confine, my study of these to logarithms of numbers whose cycle has a prime modulus. Then, the modulus of the cycle of the logarithms being one less than that of the natural numbers cannot be prime. Still so long as it is a question of employing the logarithms merely to multiply two numbers, the logarithm of the product is simply the sum of the logarithms of multiplier and multiplicand; and in addition it makes no difference whether the modulus be prime or composite. But when it comes to raising numbers to powers or to extracting their roots, the divisors of the number one less than the modulus have to be considered. The modulus being prime, the number one less must be divisible by 2. If 2 be the only prime factor, the modulus must be 3 or 5 or 17 or 65537 or much greater yet. As an example, let us take the modulus 17. Then the following two pairs of tables show the logarithms for the 8 different bases 3, 5, 6, 7, 10, 11, 12, 14.

Nat. nos.	-16	-14	-8	-7	-4	-12	-2	-6	-1	-3	-9	-10	-13	-5	-15	-11	-16
	1	3	9	10	13	5	15	11	16	14	8	7	4	12	2	6	1
Logs.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0

Nat. nos.	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Logs.	0	14	1	12	5	15	11	10	2	3	7	13	4	9	6	8
	-16	-2	-15	-4	-11	-1	-5	-6	-14	-13	-9	-3	-12	-7	-10	-8

Nat. nos.	-16	-12	-9	-11	-4	-3	-15	-7	-1	-5	-8	-6	-13	-14	-2	-10
	1	5	8	6	13	14	2	10	16	12	9	11	4	3	15	7
Logs.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1

Nat. nos.	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Logs.	0	6	13	12	1	3	15	2	10	7	11	9	4	5	14	8
	-16	-10	-3	-4	-15	-13	-1	-14	-6	-9	-5	-7	-12	-11	-2	-8

Of course, none of the even numbers can be logarithms of a possible base of another system since with a modulus 16 no multiple of an even number can be 1, the logarithm of the base. On the other hand, every odd number is in every system of logarithms the logarithm of some base.

If, instead of 13 cards and 12, the "trick" be done with 17 and

16, say the first eight hearts *increasingly* and then the first eight diamonds *decreasingly*, with the joker or king of hearts to make up 17 and with the first eight spades to correspond with the hearts and the first eight clubs to correspond with the diamonds, laying down the black cards on the table, in *two* rows, one of eight from left to right, and the other below from right to left, after having dealt the black cards 16 times into three piles and every time exchanging the top card of the middle pile for the topmost red card, so as to bring the ace of spades into the right-hand-most place of the upper row, then having done the trick substantially as above described, there is a very pretty way in which you can ask into what *odd* number of piles the *black* cards shall be dealt and then dealing out the red cards, *minus* the extra one 16 times exchanging a card each time for the three court cards and ten of each suit, so as to again render the black ones the index of the places of the red ones. But I leave it to the reader's ingenuity to find out exactly how this is to be done. *Beware of the moduli.*

There is much more to be said on this subject, but I leave it for the reader to investigate.

CHARLES SANTIAGO SANDERS PEIRCE.

MILFORD, PA.

NOTE REFERRED TO ON PAGE 452.

Denumeral is applied to a collection in one-to-one correspondence to a collection in which every member is immediately followed by a single other member, and in which but a single member does not, immediately or mediately, follow any other. A collection is in one-to-one correspondence to another, if, and only if, there is a relation, r, such that every member of the first collection is r to some member of the second to which no other member of the first is r, while to every member of the second some member of the first is r, without being r to any other member of the second. The positive integers form the most obviously denumeral system. So does the system of all real integers, which, by the way, does not pass through infinity, since infinity itself is not part of the system. So does a Cantorian collection in which the endless series of all positive integers is immediately followed by ω_1, and this by ω_1+1, this by ω_1+2, and so on endlessly, this endless series being immediately followed by $2\omega_1$. Upon this follow an endless series of endless series all positive integer coefficients of ω_1 being exhausted, whereupon immediately follows ω_1^2, and in due course $x\omega_1^2+y\omega_1+z$, where x, y, z, are integers; and so on; in short, any system in which every member can be described so as to distinguish it from every other by a finite number of characters joined together in a finite number of ways, is a denumeral system. For writing the positive whole numbers in any way, most systematically thus:

1, 10, 11, 100, 101, 110, 111, 1000, 1001, 1010, 1011, etc.

it is plain that an infinite square matrix of pairs of such numbers can be arranged in one series, by proceeding along successive bevel lines thus: (1, 1); (1, 10); (10, 1); (1, 11); (10, 10); (11, 1); (1, 100); (10; 11); (11; 10); etc. and consequently whatever can be arranged in such a square can be arranged in one row.

Thus an endless square of quaternions such as the following can be so arranged:

$$[(1,1)\ (1,1)] : [(1,1)\ (1,10)];\ [(1,1)\ (10,1)] : [(1,1)\ (1,11)];\ \text{etc.}$$
$$[(1,10)\ (1,1)] : [(1,10)\ (1,10)];\ [(1,10)\ (10,1)] : [(1,10)\ (1,11)];\ \text{etc.}$$
$$[(10,1)\ (1,1)] : [(10,1)\ (1,10)];\ [(10,1)\ (10,1)] : [(10,1)\ (1,11)];\ \text{etc.}$$
$$[(1,11)\ (1,1)] : [(1,11)\ (1,10)];\ [(1,11)\ (10,1)] : [(1,11)\ (1,11)];\ \text{etc.}$$

Consequently whatever can be arranged in a block of any finite number of dimensions can be arranged in a linear succession. Thus it becomes evident that any collection of objects, every one of which can be distinguished from all others by a finite collection of marks joined in a finite number of ways can be of no greater than the denumeral multitude. (The bearing of this upon Cantor's ω^{ω} is not very clear to my mind.) But when we come to the collection of all irrational fractions, to exactly distinguish each of which from all others would require an endless series of decimal places, we reach a greater multitude, or grade of maniness, namely, the *first abnumerable multitude*. It is called "abnumerable," to mean that there is, not only no way of counting the single members of such a collection so that, at last, every one will have been counted (in which case the multitude would be *enumerable*), but, further, there is no way of counting them so that every member will after a while get counted (which is the case with the single multitude called *denumeral*). It is called the *first* abnumerable multitude, because it is the smallest of an endless succession of abnumerable multitudes each smaller than the next. For whatever multitude of a collection of single members μ may denote, 2^{μ}, or the multitude of different collections, in such collection of multitude μ, is always greater than μ. The different members of an abnumerable collection are not capable of being distinguished, each one from all others, by any finite collection of marks or of finite sets of marks. But by the very definition of the first abnumerable multitude, as being the multitude of collections (or we might as well say of denumeral collections) that exist among the members of a denumeral collection, it follows that all the members of a first-abnumerable collection are capable of being ranged in a linear series, and of being so described that, of any two, we can tell which comes earlier in the series. For the two denumeral collections being each serially arranged, so that there is in each a first member and a singular next later member after each member, there will be a definite first member in respect to containing or not containing which the two collections differ, and we may adopt either the rule that the collection that contains, or the rule that the collection that does not contain, this member shall be earlier in the series of collections. Consequently a first-abnumerable collection is capable of having all its members arranged in a linear series. But if we define a *pure* abnumerable collection as a collection of all collections of members of a denumeral collection each of which includes a denumeral collection of those members and excludes a denumeral collection of them, then there will be no two among all such pure abnumerable collections of which one follows next after the other or of which one next precedes the other, according to that rule. For example, among all decimal fractions whose decimal expressions contain each an infinite number of 1s and an infinite number of 0s, but no other figures, it is evident that there will be no two between which others of the same sort are not intermediate in value. What number for instance is next greater or next less than one which has a 1 in every place whose ordinal number is prime and a zero in every place whose ordinal number is composite? $\cdot 1110101000101000101000001$ etc. Evidently, there is none; and this being the case, it is evident that all members of a pure second-abnumerable collection, which both contains and excludes among its members first-abnumerable collections formed of the members of a pure first-abnumerable collection, cannot, in any *such* way, be in any linear series. Should further investigation prove that a second-abnumeral multitude can in *no way* be linearly arranged, my former opinion that the common conception of a line implies that there is room upon it for any multitude of points whatsoever will need modification.

Certainly, I am obliged to confess that the ideas of common sense are not sufficiently distinct to render such an implication concerning the continuity of a line evident. But even should it be proved that no collection of higher multitude than the first abnumerable can be linearly arranged, this would be very far from establishing the idea of certain mathematico-logicians that a line consists of points. The question is not a physical one: it is simply whether there can be a consistent conception of a more perfect continuity than the so-called "continuity" of the theory of functions (and of the differential calculus) which makes the continuum a first-abnumerable system of points. It will still remain true, after the supposed demonstration, that no collection of points, each distinct from every other, can make up a line, no matter what relation may subsist between them; and therefore whatever multitude of points be placed upon a line, they leave room for the same multitude that there was room for on the line before placing any points upon it. This would generally be the case if there were room only for the denumeral multitude of points upon the line. As long as there is certainly room for the first denumerable multitude, no denumeral collection can be so placed as to diminish the room, even if, as my opponents seem to think, the line is composed of actual determinate points. But in my view the unoccupied points of a line are mere possibilities of points, and as such are not subject to the law of contradiction, for what merely *can be* may also *not be*. And therefore there is no cutting down of the possibility *merely* by some possibility having been actualized. A man who can see does not become deprived of the power merely by the fact that he has seen.

The argument which seems to me to prove, not only that there is such a conception of continuity as I contend for, but that it is realized in the universe, is that if it were not so, nobody could have any memory. If time, as many have thought, consists of discrete instants, all but the feeling of the present instant would be utterly non-existent. But I have argued this elsewhere. The idea of some psychologists of meeting the difficulties by means of the indefinite phenomenon of the span of consciousness betrays a complete misapprehension of the nature of those difficulties.

Added, 1908, May 26. In going over the proofs of this paper, written nearly a year ago, I can announce that I have, in the interval, taken a considerable stride toward the solution of the question of continuity, having at length clearly and minutely analyzed my own conception of a *perfect continuum* as well as that of an *imperfect continuum*, that is, a continuum having *topical singularities*, or places of lower dimensionality where it is interrupted or divides. These labors are worth recording in a separate paper, if I ever get leisure to write it. Meantime, I will jot down, as well as I briefly can, one or two points. If in an otherwise unoccupied continuum a figure of lower dimensionality be constructed,—such as an oval line on a spheroidal or anchoring surface,—either that figure is a part of the continuum or it is not. If it is, it is a topical singularity, and according to my concept of continuity, is a breach of continuity. If it is not, it constitutes no objection to my view that all the parts of a perfect continuum have the same dimensionality as the whole. (Strictly, all the *material*, or *actual*, parts, but I cannot now take the space that minute accuracy would require, which would be many pages.) That being the case, my notion of the essential character of a perfect continuum is the absolute generality with which two rules hold good, 1st, that every part has parts; and 2d, that every sufficiently small part has the same mode of immediate connection with others as every other has. This manifestly vague statement will more clearly convey my idea (though less distinctly,) than the elaborate full explication of it could. In endeavoring to explicate "immediate connection," I seem driven to introduce the idea of time. Now if my definition of continuity involves the notion of immediate connection, and my definition of immediate connection involves the notion of time; and the notion of time involves that of continuity, I am falling into a *circulus in definiendo*. But on analyzing carefully the idea of Time, I find that to say it is continuous is just like saying that the atomic weight of oxygen is 16, meaning that that shall be the standard for all other atomic

weights. The one asserts no more of Time than the other asserts concerning the atomic weight of oxygen;—that is, just nothing at all. If we are to suppose the idea of Time is wholly an affair of immediate consciousness, like the idea of royal purple, it cannot be analyzed and the whole inquiry comes to an end. If it can be analyzed, the way to go about the business is to trace out in imagination a course of observation and reflection that might cause the idea (or so much of it as is not mere feeling) to arise in a mind from which it was at first absent. It might arise in such a mind as a hypothesis to account for the seeming violations of the principle of contradiction in all alternating phenomena, the beats of the pulse, breathing, day and night. For though the *idea* would be absent from such a mind, that is not to suppose him blind to the *facts*. His hypothesis would be that we are, somehow, in a situation like that of sailing along a coast in the cabin of a steamboat in a dark night illumined by frequent flashes of lightning, and looking out of the windows. As long as we think the things we see are the same, they seem self-contradictory. But suppose them to be mere aspects, that is, relations to ourselves, and the phenomena are explained by supposing our standpoint to be different in the different flashes. Following out this idea, we soon see that it means nothing at all to say that time is unbroken. For if we all fall into a sleeping-beauty sleep, and *time itself stops during the interruption*, the instant of going to sleep is absolutely unseparated from the instant of waking; and the interruption is merely in our way of thinking, not in time itself. There are many other curious points in my new analysis. Thus, I show that my true continuum might have room only for a denumeral multitude of points, or it might have room for just any abnumeral multitude of which the units are in themselves capable of being put in a linear relationship, or there might be room for all multitudes, supposing no multitude is contrary to a linear arrangement.

CRITICISMS AND DISCUSSIONS.

PSEUDO-GEOMETRY.

There have appeared in *The Monist,* from time to time, articles treating of "Hyper-space," "Non-Euclidean Geometry," "Pan-Geometry," or what might more appropriately be called "Pseudo-Geometry." I am the more surprised to see these articles go unchallenged in a periodical aiming so scrupulously at rigor in reasoning as does *The Monist.*

"Pan-Geometry" may be very well as a sort of mental gymnastics to test the power of the reasoning faculty by giving it a false or impossible foundation. Such are the old arithmetical puzzles as—"If 2 were 3, what would the half of twenty be?" Likewise the algebraic imaginary; in rigor it is an impossible task since it arises from impossible conditions. The square root of minus one is impossible, and there is no such quantity in reality, since the square of every rational quantity is plus in sign. Yet from the law of signs in algebra we attempt to interpret this irrational quantity and succeed when we treat it as a mere "operator." We reason legitimately as follows: If the square of a negative is a positive and if the numerical value be unity, there is a complete reversal. Then if we consider the expression $\sqrt{-1}$ as a quantity, multiplier, or operator, we find that by using it twice it effects a reversal. If its use twice as a factor effects a complete reversal, then using it once ought to effect a half reversal. If the quantity be treated as a line, then a complete reversal is a rotation through 180 degrees, and a half reversal is a rotation of the line about one extremity through an angle of 90 degrees. General expressions of the form $a+b\sqrt{-1}$ were discussed early in the 19th century by various mathematicians and developed as "theory of complex numbers," "double algebra," and "quaternions." By use of the "operator" Hamilton took a step beyond all previous mathematicians in applying it to a directed line in space, thus founding a new science of mathematics, Quaternions. Yet in all these discussions the expression $\sqrt{-1}$ is not treated as a real quantity, but as a mere sign of operation.

All writers on "pan-geometry," and "hyper-space" to whom my attention has been called found their system on absurd or impossible postulates, and that they reach absurd results is not surprising. They assume that a straight line returns into itself; that the sum of the angles of a plane triangle is less than two right angles, or that it is greater; that the postulate of parallels is untrue, and that parallels meet at an infinite distance.

All these propositions are without validity in truth. Even the last which we meet with so often in mathematical works is untrue and never ought to be stated as true. The real meaning of the statement is that, when we consider the distance of parallels apart, it may be neglected as insignificant in comparison, when treating of lines infinitely long. As a matter of real truth the parallels are as far apart at the infinite distance as they were at the place of beginning. That is, indeed, true by our definition of parallels.

In the January (1906) number of *The Monist* Cassius J. Keyser discusses these subjects under the title "Mathematical Emancipations," endeavoring to develop and make clear to the popular imagination the idea of "hyper-space" from the theory of a "manifold assemblage." Without discussing the paper or commenting on his ability to imagine figures in four-dimensional space, I wish to point out some of his fundamental errors of assumption, leaving others to say whether any confidence can be placed in reasoning based on such foundation.

He assumes a line as a "manifold of points." This is clearly impossible. Continuous quantity cannot be represented by a manifold and its correspondent, number. The very nature of "manifold" makes it discrete and not continuous. A line cannot be made up of mathematical points, since a point has no magnitude, merely position. Two points, however near together, may have an infinite number of interpolations between them. The length of a point is an absolute zero. This multiplied by any infinite or series of infinites is still zero. We are used to saying that a zero multiplied by an infinite produces a finite; but the zero thus considered is merely an infinitesimal, to be rigorously distinguished from the zero absolute, which represents no quantity. An infinity of points with zero distance between them still has no magnitude. An infinity of points in a line represents a discrete quantity and not a continuum, and may be represented by discrete number 1, 2, 3 etc., where we may make the unit as small as we please, but never an absolute zero.

As soon as we give a point magnitude we start with three-dimen-

sional space, and all our reasoning is in three-dimensional space: our line is length, breadth, and thickness, though the latter two may be infinitesimals; our surfaces are length, breadth, and thickness, though the last may be an infinitesimal. It is thus evident that we cannot pass from one order of space to another by any system of multiplication. Points cannot become a line; nor lines, a surface; nor surfaces, a solid.

It is true that a point in motion describes a line and must describe a line. A line may describe a line, if it follow along itself as a path; otherwise its motion must describe a surface. A surface (a plane and surface of a sphere only) may describe a surface if it follows along itself as a path; otherwise it must describe a solid. A solid in motion may describe an infinite number of solids, but its motion always describes a solid. It may be a solid of revolution, a prism, a tortuous prism or cylindroid etc. It cannot be conceived as describing space other than three-dimensional. We have no valid reason for assuming that there is any higher order of space in the ordinary signification than three-dimensional. Indeed there is the best of reasons for assuming that there is none.

Volumes have been written by psychologists and philosophers to explain the notion of space; and the more these philosophers write, the more they seem to think there is something mysterious about it, and the more they themselves become befogged in their reasoning about it. It is a mere matter of definition; everyone knows what it is and can usually define what he means by the word. One might as well attempt to prove that a straight line is straight, or that a circle is circular. Discussions of all self-evident truths are profitless; except it may be to show how such truths are apprehended, and it is extremely doubtful whether these succeed in the sense of giving mental satisfaction.

But what I wish most to protest against, is the use of fundamental untruths as the basis of rigorous reasoning, and insisting on the truth of the deductions when negatived by consciousness and common reason.

LANSING, MICH. CHAS. H. CHASE.

EDITORIAL COMMENT.

This communication on "Pseudo-Geometry" by Judge Charles H. Chase has a certain justification. It is an expression of common sense against being bulldozed into mysticism by the extravagances of a highly abstruse reasoning, and we endorse his protest so far

as to say that we too do not believe in pseudo-geometry. We have explained our own view on mathematics in a series of articles, published in *The Monist,* XIII, 273, 370, 493, and need not repeat ourselves here. In these articles we have not countenanced metageometry except as a method of space-construction which is possible, but which possesses little practical use because our old traditional geometry is simpler and better adapted to the solution of the problems of space-relations. Pangeometry as a higher generalization is helpful in order to understand certain problems because it makes Euclidean geometry appear as one special case among several possibilities.

The problem of the significance of metageometry as well as pangeometry is, however, not quite so simple as Judge Chase would have us believe. The reason of the mathematicians is in no way different from common sense. The mechanism of the two differs only as a precision machine would be different from any other one built in a rougher style. At the same time we must insist that a person operating the more delicate micrometer is just as apt to make mistakes as the man who uses a foot-rule. Mathematicians and philosophers have made mistakes as well as the people of common sense, and so we must not be astonished to find in the realm of abstruse thought statements which common sense would deem extravagant or even obviously self-contradictory.

We must bear in mind that geometry together with arithmetic and logic are constructions of pure thought. They are not realities, nor do they represent real things. They represent mere relations, and we are at liberty to make these constructions according to the principles which we lay down at the start. The simplest principle will lead to the simplest system, and it is obvious that the simplest system will be most useful for dealing with actual things. Our geometrical constructions are like models representing relations in pure thought which may exist in reality.

We must distinguish therefore between geometrical space and real space. It is a pity that both are denoted by the same word. Actual space is an objective feature of the things with which we become acquainted in our experience. Our space-conception, however, is mere thought, but it is useful in calculating the space-relations of real things.

It is possible to construct several spaces in the realm of pure thought, but it is not possible to assume that there are several spaces in the objective world. The space of objective existence is simply

the juxtaposition of things, or the scope of the changes that may be made in this juxtaposition. In other words, space is the scope of motion. The two definitions are practically the same, but I would prefer the latter one as more descriptive of both the nature of space and the origin of our space-conception. The former definition, "the juxtaposition of things" is static; the latter, "the scope of motion," is dynamic, and since life is action, the latter seems more appropriate.

By moving about we construct our space-conception from the fact of our own motility, which means that we can move about and change the place of our own position as well as the position of things in our surroundings.

According to Kant our space-conception is *a priori*, which means in Kantian terminology that it can be constructed without resorting to sense-impressions. This is true, but nevertheless geometry is not absolutely *a priori*. It makes use of the idea of motion which we tacitly retain and utilize in constructing our field of action, i. e., our general conception of space.

The geometrician experiments with his motion, and constructs points, lines, surfaces and solids. None of them are real, but all of them are called true if they are constructed with rigid consistency according to the principle laid down. A theorem is true if it agrees with the necessary result acomplished by construction—a result which in most cases is uniquely determined.

There are cases in which the function can not be executed. Such is especially the extraction of the square root of minus quantities, and so mathematics is nonplused when it is confronted with the solution of $\sqrt{-1}$. This is called the irrational, but it had better be called "the unrealizable." It is not against reason; the simple truth is, it can not be done.

We agree perfectly with Judge Chase when he denounces mathematicians for speaking of the sum of the angles of a plane triangle as being more or less than two right angles. If a triangle is plane the sum of the angles is unequivocally equal to two right angles, for it has been made so by construction, and there can be no quibbling about it. If there were any doubt we would have to insist that the triangle, the sum of whose angles is more or less than 180°, can not be a plane triangle but must belong to another system of geometry. When we deal with real space we may boldly say that the method of measuring and determining points by three co-ordinates will always prove sufficient, and this is all that can reasonably be meant by the statement that space, viz., the objective space of things, is

tridimensional, but if we deal with space-conceptions as mathematical constructions we may very well build up systems of different manifoldness, and need not limit ourselves to three dimensions. By moving a point we create a line; by moving a line in another but its own direction we create a surface; by moving a surface not in its own plane but in some other direction we create a solid. Now if we move a real solid in actual space we produce a change of place but we do not create a new dimension; but if we move a mathematical solid at the same time retaining its path just as we did before when creating the surface from a line and the solid from a surface we shall not leave this geometrical solid unaltered but we shall produce a new kind of a body which is four-dimensional, and which augments the significance of the solid just as the path of the surface increased the significance of the plane.

The difficulty consists solely in the fact that actual space, viz., our scope of motion, allows us to go in any direction possible, and however much we may strain our imagination, we can not find a direction not already contained in the solid. So in reality we can not fulfil the condition that in constructing the next higher figure we must move at a right angle in a direction not contained in the figure with which we start. But what is impossible in actual space is allowable to the imagination.

We must grant that the four-dimensional figure is imaginary, but it is no more imaginary than mathematical lines, surfaces and solids. The space through which the solid travels is, as it were, (if we cling to the motion of tridimensional space) in part covered twice, and it is true we can have no conception of its appearance.

The realm of thought is wide, and so nothing will prevent us from making any imaginary construction of four-dimensional bodies, and the strange thing about it is that though we can not picture it as a sense-perceptible form we can determine the laws of four-dimensional bodies with absolute exactness. Take for instance a line of three linear inches. If we move it at right angles with its own direction the surface will contain nine square inches. If we now move the surface again in a direction at right angles to the plane we will have a solid of twenty-seven cubic inches, and here our mode of representing further results of motion in a sense-perceptible image stops. But suppose we should move it again at the right angle of its own former construction (whatever that may be) we shall construct a figure, unrealizable though it may be, which will consist of 81 inches, each one being possessed of four directions.

This method of geometrizing is, as Judge Chase rightly says, a kind of mental gymnastics, but in principle it is in no wise different from Euclidean geometry and solid geometry. It is a construction of pure thought and is the product of generalizing the idea of dimension which creates new possibilities, incompatible though they may be with actual space.

There are some who talk about the possibility that our objective space may not be Euclidean but like one of the hyperspaces of modern mathematicians. But the hypothesis is worthless if we consider that objective space does not consist of objective things, but is a mere scope of motion. Whatever may be said in justification and in praise of metageometry, one thing is sure: There is no mathematician who for the sake of calculating distances, loci, or angles in the conditions of actual space would utilize or seriously recommend the use of any other but the Euclidean geometry.

SPACE OF FOUR DIMENSIONS.

The several conceptions of space of more than three dimensions are of a purely abstract nature, yet they are by no means vague, but definitely determined by the conditions of their construction. Therefore we can determine their abstract thought and very details with perfect exactness and formulate in abstract thought the laws of four-, five-, six-, and n-dimensional space. The difficulty with which we are beset in constructing n-dimensional spaces consists in our inability to make them representable to our senses. Here we are confronted with what may be called the limitations of our mental constitution. These limitations, if such they be, are conditioned by the nature of our mode of motion, which if reduced to a mathematical system needs for a description in definite terms three co-ordinates, and this means that our space-conception is tridimensional.

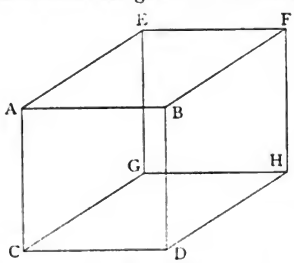
We ourselves are tridimensional; we can measure the space in which we move with three co-ordinates, yet we can definitely say that if space were four-dimensional, a body constructed of two factors, so as to have a four-dimensional solidity, would be expressed in the formula:

$$(a+b)^4 = a^4+4a^3b+6a^2b^2+4ab^3+b^4.$$

We can calculate, compute, excogitate, and describe all the characteristics of four-dimensional space, so long as we remain in the realm of abstract thought and do not venture to make use of our motility and execute our plan in an actualized construction of

motion. From the standpoint of pure logic, there is nothing irrational about the assumption; but as soon as we make an *a priori* construction of the scope of our motility, we find out the incompatibility of the whole scheme.

In order to make the idea of a space of more than three dimensions plausible or intelligible, we resort to the relation between two-dimensional beings and tridimensional space. The nature of tridimensional space may be indicated yet not fully represented in two-dimensional space. If we construct a square upon the line AB one inch long, it will be bounded by four lines each one an inch in length. In order to construct upon the square ABCD a cube of the same measure, we must raise the square by one inch into the third dimension in a direction at right angles to its surface, the result being a figure bounded by six surfaces, each of which is a one-inch square. If two-dimensional beings who could not rise into the third



dimension wished to gain an idea of space of a higher dimensionality and picture in their own two-dimensional mathematics the results of three dimensions, they might push out the square in any direction within their own plane to a distance of one inch, and then connect all the corners of the image of the square in its new position with the corresponding points of the old square. The result would be what is to us tridimensional beings the picture of a cube.

When we count the plane quadrilateral figures produced by this combination, we find that there are six corresponding to the boundaries of a cube. We must bear in mind that only the original and the new square will be real squares, the four intermediary figures which have originated incidentally through our construction of moving the square to a distance, exhibit a slant which our two-dimensional beings must regard as distortions of a rectangular relation, which faultiness has been caused by the insufficiency of their

methods of representation. Moreover all squares count in full, and where their surfaces overlap they count double.

Two-dimensional beings having made such a construction must however bear in mind that the field covered by the sides, GEFH and BFDH, does not take up any room in their own plane, for it is only a picture of the extension which reaches out either above or below their own plane; and if they venture out on this field covered by their construction, they have to remember that it is as empty and unoccupied as the space beyond the boundaries AC and AB.

Now if we tridimensional beings wish to do the same, how shall we proceed?

We must move a tridimensional body in a rectangular direction into a new (i. e., the fourth) dimension, and, being unable to accomplish this, we may represent the operation by mirrors. Having three dimensions we need three mirrors standing at right angles. We know by *a priori* considerations according to the principle of our construction that the boundaries of a four-dimensional body must be solids, i. e., tridimensional bodies, and while the sides of a cube (algebraically represented by a^3) must be six surfaces (i. e., two-dimensional figures, one at each end of the dimensional line) the boundaries of an analogous four-dimensional body, built up like the cube and the square on a rectangular plan, must be eight solids, i. e., cubes. If we build up three mirrors at right angles and place any object in the intersecting corner we shall see the object not once but eight times. The body is reflected below, and the object thus doubled is mirrored not only on both upright sides but also in addition in the corner beyond, appearing in either of the upright mirrors coincidingly in the same place. Thus the total multiplication of our tridimensional boundaries of a four-dimensional complex is rendered eightfold.

We must now bear in mind that this representation of a fourth dimension suffers from all the faults of the analogous figure of a cube in two-dimensional space. The several figures are not eight independent bodies but they are mere boundaries and the four dimensional space is conditioned by their interrelation. It is that unrepresentable something which they enclose, or in other words, of which they are assumed to be boundaries. If we were four-dimensional beings we could naturally and easily enter into the mirrored space and transfer tri-dimensional bodies or part of them into those other objects reflected here in the mirrors representing the boundaries of four-dimensional objects. While thus on the one hand the mir-

rored pictures would be as real as the original object, they would not take up the space of our three dimensions, and in this respect our method of representing the fourth dimension by mirrors would be quite analogous to the cube pictured on a plane surface, for the space to which we (being limited by our tridimensional space-conception) would naturally relegate the seven additional mirrored images is unoccupied and, if we make the trial, will be found empty.

Further experimenting in this line would render constructions of a more complicated character more and more difficult although not quite impossible. Thus we might represent the formula $(a+b)^4$ by placing a wire model of a cube, representing the proportions $(a+b)^3$ in the corner of our three mirrors, and we would then verify by ocular inspection the truth of the formula

$$a^4+4a^3b+6a^2b^2+4ab^3+b^4.$$

However we must bear in mind that all the solids here seen are merely the boundaries of four dimensional bodies. All of them with the exception of the ones in the inner corner are scattered around, and yet the analogous figures would have to be regarded as being most intimately interconnected, each set of them forming one four-dimensional complex. Their separation is in appearance only, being due to insufficiency of our method of presentation.

We might obviate this fault by parceling our wire cube and instead of using three large mirrors for reflecting the entire cube at once, we might insert in its dividing planes double mirrors, i. e., mirrors which would reflect on the one side the magnitude a and on the other the magnitude b. In this way we would come somewhat nearer to a faithful representation of the nature of four-dimensional space, but the model, being divided up into a number of mirror-walled rooms, would become extremely complicated, and it would be difficult for us to bear always in mind that the mirrored spaces count on both sides at once, although they overlap and (tridimensionally considered) seem to fall the one into the other, thus presenting to our eyes a real labyrinth of spaces that exist within each other without interfering with one another. They thus render new depths visible in all three dimensions, and in order to represent the whole scheme of a four-dimensional complex in its full completeness, we ought to have three mirrors at right angles placed at every point in our tridimensional space.

Our scheme of inserting mirrors at every point is impossible, but the idea will render the nature of four-dimensional space approximately clear. If we were four-dimensional beings we would be

possessed of the mirror eye which in every direction could look straightway into every corner of the third dimension. This seems incredible, but it cannot be denied that tridimensional space lies open to an inspection from the domain of the fourth dimension, just as every point of a Euclidean plane is open to inspection from above to tridimensional vision. Of course we may demur (as we actually do) to believing in the reality of a space of four dimensions, but that being granted, the inferences can not be doubted. EDITOR.

PROF. LAWRENCE H. MILLS OF OXFORD.

Among those appointed by the Hebdomadal Council of Oxford to represent the University at the coming Congress of Orientalists at Copenhagen the veteran Professor Mills is prominent. He has lately reached his seventy-first birthday, and, though he has long been in a painful condition from various complications of disease, his general health is fairly good, and his professional activities are very extensive. He has now strong hopes of living to complete his various works. *The Dictionary of the Gāthic Language of the Zend Avesta* is approaching its three hundredth page, bringing up the Gāthas to about 977 pages in all. The next section will soon be delivered to purchasers. He will also be shortly delivering the first chapter of the Yasna in the four texts: Avesta, Pahlavi, Sanskrit and Persian, with translations of the first three as in the Gāthas (Brockhaus), but he is forced to abandon the favored synoptical form of that earlier book on account of the Pahlavi text which is given both in the original character from the *Muséon* of Louvain, Belgium, with all the variants of all the manuscripts, also in the original character, as well as in the transcription of it from the *Zeitschrift* of the German Oriental Society, with the translation from the *Journal of the Royal Asiatic Society*. On account of this twofold edition of the Pahlavi this one chapter will occupy at least one hundred pages in large form. Mr. Mills has edited in all some fifty odd chapters of the Yasna, now deciphered with the collation of all of the manuscripts, but, save in the Gāthas and in Yasna, the first variants are not as yet fully published, though they are in manuscript. About thirty-two of these chapters have appeared in the *Zeitschrift* of the German Oriental Society, with translations of some thirty-four in the *Journal of R. A. S.*, London.

This work being the crux of Avesta philology, requires reconstructions of the Avesta texts, as of their translations at every step. No lexicography is to be compared with it in difficulty, for

it includes lexicography, except such lexicography as includes it. Mr. Mills has published two chapters of the Gâthas in their Sanskrit equivalents as a mere side-work, the Zend being practically Sanskrit. One of these appeared in Roth's *Festgruss*, 1894, and one in the *Actes* of the International Congress in Paris in 1897. Other portions of these translations into Sanskrit will be offered at the forthcoming Congress at Copenhagen.

The Avesta contains the sister religion to that of Exilic Israel, being also a reformed section of what was the original of the Vedic religion, in a language nearer to Sanskrit than Greek is to Greek. Oldenberg, referring to the translation in Roth's *Festgruss*, says in *Vedic Religion*, p. 27: "Dass eine solche Uebertragung oft nicht allein correcte vedische Worte und Sätze ergeben würde, sondern Verse, aus denen die Seele vedischer Dichtkunst zu sprechen scheint."

Oxford has lately made her most distinguished acquisition in the person of the Chancellor, Lord Kurzon of Keddleston, the most prominent figure now present in the British Empire, and what is equally gratifying, she has acquired for this position an eminent scholar and important writer upon Persia past and present.

His Lordship favored Oxford with a short residence in the Autumn (not, as we grieve to say, accompanied by that endeared lady now mourned by two continents). Among other experienced guests he honored the aged Professor Mills, who assisted by an attendant, greatly appreciated the attention.

Another pleasant incident has met the Professor in the literary application of a distinguished young Italian lawyer of Turin, Italy, apparently also connected officially with its Chamber of Commerce. Entirely without any previous knowledge of this very able translator, Professor Mills received a most courteous communication, asking for permission to translate some of his works into Italian. Mr. Mills, as need hardly be said, cordially met this request; and three pieces, two of them lectures delivered in Oxford, are now in type and will soon be issued. Not without interest was also a communication from an able professor in Chile urgently requesting information as to Professor Mills's works, and the subject in general.

Professor Mills has just published an article in the *Journal of the Royal Asiatic Society* and another one will soon be forthcoming in *Z. D. M. G.* Meanwhile others are preparing, and the text editions and Gâthic dictionary are making progress,—and this at the author's advanced age of seventy-one.

BOOK REVIEWS AND NOTES.

OUTLINES OF MAHÂYÂNA BUDDHISM. By *Daisetz Teitaro Suzuki*. London: Luzac & Co., 1907. Pp. xii, 420. 8s 6d. net.

This is the first book ever written on Mahâyâna Buddhism which makes any claim to a systematic presentation of the subject. Hitherto European scholars of Buddhism were wont to treat Mahâyânism as a mere degenerated form of "Primitive Buddhism," which is to-day represented by the Buddhism prevailing in Ceylon, Burma, Siam, and other Asiatic countries, and which is designated by the followers of Mahâyânism as Hînayâna Buddhism. Such authors as Beal, Edkin, Wassiljew and others tried to expound the fundamental ideas of Mahâyânism in their treatment of Chinese and Japanese Buddhism; but their method was not strictly systematic. Besides they had no synthetic knowledge of the subject, for their information was gained through not very authentic sources, or through some Mahâyâna books which they picked out of the Chinese Tripitaka at their pleasure. Kern, Burnouf, Poussin, Lévi, Max Müller, Mitra, and other Sanskrit scholars have attempted to describe the essential characteristics of Mahâyânism through the Sanskrit Buddhist texts found in Nepal; and we must admit that some of them have been fairly successful in the attempt.

But, as we know, these Sanskrit documents of Buddhism are merely a small portion of the vast amount of Mahâyâna literature preserved in China, Japan and Tibet; and it is clearly evident that our correct knowledge of Mahâyânism as it is believed to-day by millions of Asiatic people, as well as its historical development in India, China and Japan, cannot be gained until the Chinese and Tibetan Tripitaka has been thoroughly investigated. Csoma de Körös, Nanjo, Schiefner and others have done much towards this end, but every Mahâyâna student knows well that a rich harvest is waiting for the laborers.

What Mr. Suzuki has accomplished here is not a strictly scholarly work, for, as he says in his preface, it has also been his intention to provide a popular exposition of Mahâyâna Buddhism which has very frequently been grossly misunderstood, and hence misinterpreted, by less informed writers of the West. Mr. Suzuki is a Japanese Buddhist, but liberal and impartial; he proceeds systematically in his presentation of the subject. What makes this book most valuable to European scholars is its numerous allusions to the Chinese Tripitaka, which mainly on account of the linguistic difficulties has not been explored as it ought to, but with which our author is perfectly at home.

This book is divided into three parts: I. Introductory, II. Speculative Mahâyânism, and III. Practical Mahâyânism. In the Introductory part the

author treats of the distinction between Mahâyâna and Hinayâna Buddhism, the historical significance of Mahâyânism, the general characteristics of Buddhism, and the historical characterization of Mahâyânism, in which are quoted such Hindu Buddhist philosophers as Sthivamati, Asanga, Nâgârjuna, Açvaghosha, Aryadwa, etc. "Speculative Mahâyânism" contains chapters on Practice and Speculation, Classification of Knowledge, Bhûtatathâtâ (Suchness), The Tathâgata-Garbha and the Alaya-vijñâna, The Theory of the Non-Atman and Karma. Under "Practical Mahâyânism," Mr. Suzuki includes the Dharmakâya, The Doctrine of Nikâya, The Bodhisattva, The Ten Stages of Bodhisattvahood, and Nirvana. As an Appendix the book contains some Hymns of the Mahâyâna faith, which are taken from various Mahâyâna sutras existing in Chinese translations.

These *Outlines* serve as a very good introduction to a more comprehensive treatise of the subject, which, it is hoped, our author will attempt in the future when his extensive knowledge of Chinese Buddhist literature is further supplemented with that of the Sanskrit, however fragmentary the latter may be.

L'ANNÉE PSYCHOLOGIQUE: treizième année. Publiée par *Alfred Binet*. Paris: Masson et Cie., 1907. Pp. 494. Price, 15 fr.

The thirteenth issue of this valuable annual contains the following original contributions: The Relativity of Space, by Poincaré; The progress of Psychophysics, by Foucaut; The Perception of Psychical Facts, by Souriau; Insects and the Color of Flowers, by Plateau; The Work of Pawlov on the Secretion of Psychical Saliva, by Zeliony; The Physician and the Teacher, by Ley; Psychology and Metapsychics, by Maxwell; Touch and the Muscular Sense, by Van Biervliet; Visual Memory of Abnormal Beings, by Decroly and Degand; Articular and Muscular Sense, by Bourdon; Increase and Decrease of N Rays, by Piéron; The Acquisition of Habits in Animals, by Bohn; Written Reports and the Dreyfus Case, by Crépieux-Jamin; Nature and the Origin of Instincts According to Weismann, by Maigre; Scientific and Experimental Study of Professional Work, by Imbert; Intellectual Debility in Early Insanity, Senile Insanity, and General Paralysis, by Masselon; Chronic Mental Confusion, by Regis and Laurès; The Race Question in Psychology, by Deniker; The Physical and Chemical Conditions of the Action of Nerve Centers, by Fredericq; The Co-operation of School and Family, by Chabot; The Evolution of the Problem of Aphasia, by Bernheim; Pain and the Nerves of Pain, by Wertheimer; The Sensitive Tracts of the Nervous System, by Van Gebuchten; The Double Individuality of Plants, by Bonnier; The Modern Doctrines of Ethics, by Cantecor; The Psychology of Thought, by Larguier.

DIE MECHANIK IN IHRER ENTWICKLUNG. Von *Dr. Ernst Mach*. 6th edition. Leipsic: Brockhaus, 1908. Pp. 576. Price 8m., cloth 9 m.

Professor Mach's Mechanics has now appeared in its sixth edition, which lies before us with a few additions made with reference to propositions of Anding, Duhem, Föppl, Hartmann, Seeliger, Vailati and Wohlwill. Otherwise the book shows no change in comparison to former editions, especially the fifth. We recognize it as decidedly a good sign of the increasing interest taken

in scientific matters that a book like this one has become so popular. It is true that Mach's expressions are almost indispensable for any one who devotes himself to a scientific study of mechanics. His work is practically the only one which takes into account the historical origin of our science. Nevertheless it is not easy reading, and thus the circle of students who would devote themselves to it is quite limited. Mach's book, as the author insists in his preface to the first edition, is not a text book to study the principles of mechanics, but a guide into the history of the subject so that it addresses itself mainly to those who take an interest in the nature of problems in question and desire to understand how man acquired his mechanical knowledge. Mach was not a scientist only, he was conscious of the foundation which every science needs, and this made him a philosopher. The principle which he finds in the history of mechanics is a tendency toward an economy of thought, and this economy of thought becomes to him the characteristic feature of all science Professor Mach's significance both in philosophy and in natural science is sufficiently known and needs no special application in this case, and we may add that his reputation is fully sustained and justified in the present volume which may be regarded as the chief fruit of his life's work. It has been translated into almost all modern languages, and the English translation has been brought out by the Open Court Publishing Company, which has done its best to keep its edition up to date. The present sixth edition, however, contains additions of approximately 12 pages, which have not as yet been incorporated in the English version.

ESSAI CRITIQUE ET THEORIQUE SUR L'ASSOCIATION EN PSYCHOLOGIE. Par *Dr. Paul Sollier*. Paris: Alcan, 1907. Pp. 187. Price 2 fr. 50.

Dr. Paul Sollier, who in 1900 published a book on "The Problem of Memory," supplements his former investigation by a critical essay on "Association in Psychology." It is a summary of his lectures given at the Université Nouvelle de Bruxelles. He starts from the simplest and crudest phenomena and proceeds to the more complicated instances, whereupon he gives his exact definitions. He considers association from the psysiological rather than from the psychological side, and formulates from the different data his general theory of the mechanism of association.

The book is divided into four chapters. The first discusses the definition and explanation of the problem; the second, the laws of association, first those commonly admitted and second, those which have been contradicted and are still under dispute; third, contradictions, and finally gaps. Chapter III takes up the several theories, the psychological, anatomical, physiological and finally the dynamic theory. The last chapter enters into the mechanism of association, its origin, its preservation, the way in which it is evoked, the evolution of association, its strength and its rapidity, and finally its nature.

SOURCE BOOK IN ANCIENT PHILOSOPHY. By *Charles M. Bakewell*. New York: Charles Scribner's Sons, 1907. Pp. 395.

The student of classical philosophy will hail this book of Professor Bakewell because it is one of the most useful compilations of passages referring

to the several Greek philosophers. The book is exactly what its title indicates, "a source book," and we find in it translations of passages on the Milesian School, the Eleatic School, Heraclitus, the Pythagorean Philosophy, Empedocles, Anaxagoras, the Atomists, the Sophists, Socrates, Plato, Aristotle, the Stoics, Epicurus, Lucretius, Epictetus, Marcus Aurelius, Plotinus.

The compilations of Greek passages have been made by Ritter, and nowhere has the matter been collected in such a handy shape for English students. The selection of the passages seems to be pretty well made and sufficiently typical of the several schools.

The Dürr Publishing Company at Leipsic continues its publication of the *Philosophische Bibliothek*, in which it issues a series of philosophical books at a relatively cheap price. Before us lie Immanuel Kant's *Grundlegung zur Metaphysik der Sitten*, (price 4 m. 60); Hume's *Enquiry Concerning Human Understanding*, a German translation edited by Raoul Richter; Hegel's *Phänomenologie des Geistes* (price 5 m.) edited and revised and with an introduction by Georg Lasson; a commentary in German to *The Critique of Pure Reason* by Hermann Cohen (price 2 m.); and finally also Kirchner's Philosophical Dictionary, newly edited by Dr. Carl Michaëlis, which has increased its size to 708 pages, and is now in its 5th edition (price 8 m.). (The prices mentioned are all for paper bound copies.)

BOOKS RECEIVED.

Talks on Religion. Recorded by Henry Bedinger Mitchell. New York: Longmans, Green & Co., 1908. Pp. 325. Price $1.50.—The Doctrines of the Religion of Truth. By P. Sankaranarayana. Madras: Vest & Co. Pp. 114. Price 6d.—The Gospel of the Religion of Truth. By P. Sankaranarayana. Madras: Vest & Co. Pp. 248. Price 1s.—The Church of To-day. By J. Crooker. Boston: Pilgrim Press, 1908. Pp. 177.—The Rule of "Not Too Much." By H. E. O. Heinemann. Chicago: 1908. Pp. 156.—The Philosophy of Loyalty. By Josiah Royce. New York: Macmillan, 1908. Pp. 409. Price $1.50.—Sociologie de l'action. Par Eugène De Roberty. Paris: Alcan, 1908. Pp. 352. Price 7 fr. 50.—Poems and Translations. By Frederick Rowland Marvin. Troy, N. Y.: Pafraets Book Co., 1907. Pp. 164.—Vitality, Fasting and Nutrition. By Hereward Carrington. New York: Rebman Co., 1908. Pp. 648.—The Gospel of Pain. By Thomas J. Hardy. London: Geo Bell & Sons, 1908. Pp. 223. Price, 3s. 6d. net.—An Open Letter to Cardinal Gibbons. By Paul Sabatier. Boston: Sherman, French & Co., 1908. Pp. 88. Price 60 c. net.—The Study of Stellar Evolution. By Geo. Ellery Hale. Chicago: University of Chicago Press, 1908. Pp. 252, 104 plates. Price $4.27 postpaid.—Faith in Man. By Gustave Spiller. New York: Macmillan, 1908. Pp. 190. Price 75 c. net.—The Science and Philosophy of the Organism. By Hans Driesch. New York: Macmillan, 1908. Pp. 329. Price $3.00 net.—Das Christentum. Fünf Einzeldarstellungen von C. H. Cornill u. a. Leipsic: Quelle & Meyer, 1908. Pp. 164.

The Japanese Floral Calendar

By Ernest W. Clement, M. A. Printed on best paper. Profusely illustrated. Pp. 60. Board cover with cloth back. Octavo. 50c. (2s. 6d. net.)

"A beautiful book on a phase of Japanese life of which the Occident knows little."—*Mobile Register.*

"It is one of the most perpetually seasonable gift books."—*The Church Review.*

"Just the information which we Americans like to have about the unique Japanese custom of 'flower viewing' is covered in this little volume."—*The Chautauquan.*

"The book should please and instruct any one who takes it up, and prove especially welcome to students of Eastern forms of simple native worship."—*The Scotsman.*

My Little Book of Prayer

By Muriel Strode. Strathmore Japan paper, cloth, $1.00. (4s. 6d. net.) Alexis paper, boards, 50c. (2s. 6d. net.)

To attempt to tell what a treasure trove for the struggling soul is in this little volume would be impossible without giving it complete, for every paragraph marks a milestone on the higher way. That the best of all modern thought and religion is garnered in it its very creed proclaims:

> Not one holy day, but seven.
> Worshiping not at the call of a bell, but at the call of my soul;
> Singing, not at the baton's sway, but to the rhythm in my heart;
> Loving because I must,
> Doing for the joy of it.

Some one who has "entered in" sends back to us this inspiring prayer book, and to seize its spirit and walk in the light of it would still the moan and bitterness of human lives as the bay wreath ends the toilsome struggle up the hero's path. *St. Louis Globe-Democrat.*

THE OPEN COURT PUBLISHING CO., 1322 Wabash Ave., Chicago

Behind the Scenes with the Mediums

By DAVID P. ABBOTT

328 Pages, Cloth, Gilt Top - - - Price, $1.50 net

TABLE OF CONTENTS

THE OPEN COURT PUBLISHING CO., 1322 Wabash Ave., Chicago

Spinoza and Religion

By

Elmer Ellsworth Powell

Professor of Philosophy in Miami University.

This book is accurately described on the title page as "a study of Spinoza's metaphysics and of his particular utterances in regard to religion, with a view to determining the significance of his thought for religion and incidentally his personal attitude toward it."

PRESS NOTICES

"Professor Powell has produced an exceedingly able and authoritative book. Few will read it without feeling that it settles for them the question of Spinoza's real attitude to God and to religion. And those who read it will obtain incidentally the benefit of a clear and consistent presentation of the whole philosophic system of one of the most difficult to understand of all the great thinkers of European history."

—*The Glasgow Herald.*

"It is a particularly illuminating exposition of the whole subject that is here given by Professor Powell . . . . A book of uncommon intelligence, acumen and carefulness of investigation."—*The Chicago Evening Post.*

"Altogether, Professor Powell makes out a good case for the main proposition, and his work is likely to affect current opinion as to the general position of Spinoza, in the course of religious thought. He will have to be counted with by every student of philosophy and religion, and should be specially studied by those who claim that Spinoza is specifically a Jewish philosopher."—*The American Hebrew.*

"Throughout the author demonstrates his familiarity with the field and his liveness of interest. The style, furthermore, is excellent."—*The Nation.*

"The book is clear in style, thorough in execution, and exhibits much logical acumen."—*Journal of Philosophy, Psychology and Scientific Methods.*

"L'analyse de la conception spinoziste de Dien lui fournit l'occasion de faire ressortir quelques-unes des obscurités les plus considerables d'un texte qu'il connait à fond et qu'il critique avec une remarquable sagacité."—*Revue Philosophique.*

"We have in this volume an able and impartial attempt to determine, first, what Spinoza taught and, second, how this teaching relates itself to religion."

—*The Princeton Theological Review.*

Pp. xi + 344, Price, cloth $1.50 net (7s. 6d.)

THE OPEN COURT PUBLISHING CO.
378-388 WABASH AVENUE :: :: :: CHICAGO, ILL., U. S. A.

PRESS NOTICES AND INDIVIDUAL OPINIONS OF

A SCRAPBOOK OF Elementary Mathematics

NOTES, RECREATIONS, ESSAYS

By WILLIAM F. WHITE, Ph. D., State Normal School, New Paltz, New York.

FRONTISPIECE AND 70 DIAGRAMS AND OTHER ILLUSTRATIONS

12 mo. 248 pp, cloth binding, gilt top, price $1.00 net. (5s. net.)

"IN THIS BOOK MATHEMATICS IS PRESENTED IN LITERARY FORM."

The following individual opinions are from letters written to the author and have reference to sections of the book as they appeared as magazine articles. Except where the plural is used, they referred only to the story "Alice in the Wonderland of Mathematics," the only article that had then appeared.

FROM THREE OF AMERICA'S FOREMOST MATHEMATICIANS

Gems

"These gems of yours from the Open Court. They delight me."
— *George Bruce Halsted.*

Vital interest

"I read them and enjoyed doing so. I heartily congratulate you upon your success . . . I always take time to look into things that come from your pen. I know that I shall find something of vital interest in them."
— *David Eugene Smith.*

Knew where to stop

"I congratulate you most heartily. I do not see where it could be improved. You knew where to stop as well as where to begin."—*James M. Taylor.*

FROM OTHERS BEARING WELL-KNOWN NAMES

Charming essays

Dr. Ernst Mach, professor in the University of Vienna, recently called the greatest of living scientists, began his letter:
"In einem Ihrer reizenden Aufsätze."

Very ingenious

Prof. W. H. Crawshaw, author of *The Making of English Literature:*
"Very ingenious and withal decidedly interesting."

Imagination with technical studies

Prof. Albert Perry Brigham, author of *A Text-book of Geology, Geographic Influences in American History, From Trail to Railway, etc.:*
"'Alice in the Wonderland of Mathematics,'—a pretty illustration of the value of joining the imagination with technical studies."

A facile pen

R. P. Williams, author of the books on chemistry and a departmental editor of *School Science and Mathematics:*
"You wield a facile pen . . . The Open Court reprints are very interesting and instructive."

More roses and fewer thistles

Washington Irving, nephew of "the first American man of letters":
"In the study of mathematics, had I had such a guide as you, I am certain I should have found more roses and been stung by fewer thistles."

First mathematics I ever enjoyed

Also one from a former college president, now a real estate dealer:
"The first mathematics I have ever enjoyed, except figuring up interest money. It is splendid."

REVIEWS OF THE BOOK

A keen insight into the beauty of applied mathematics

"The book is unique in its presentation of problems and theories and a number of short methods are explained. The book treats of arithmetic, algebra and geometry and the illustrations are for the most part drawn from the scientific, commercial and industrial activities of the day. Properly speaking it is not a text-book but a keen insight into the beauty of applied mathematics as a study."
—The *Colgate Madisonensis*, Colgate University, Feb. 11, 1908.

An amusing and breezy element

"Professor William F. White, Ph. D., of the mathematical department of the State Normal School at New Paltz, N. Y., has published, through the Open Court Publishing Company, a volume entitled *A Scrapbook of Elementary Mathematics*. The 'science of numbers' is usually regarded in the light of a dry and serious pursuit. But Mr. White infuses into it an amusing and breezy element which shows that even so prosaic a subject has its lighter side, and that, too, without sacrificing the mathematical rigor which necessarily pertains thereunto. ($1.)"

—The *Examiner*, N. Y. Department of Literary Notes, March 12, 1908.

A long-felt want

"The book is interesting, valuable and suggestive. It is a book that really fills a long-felt want. It is a book that should be in the library of every high school and on the desk of every teacher of mathematics."

—*The Educator-Journal.*

The following extracts from the table of contents will serve to indicate the nature and scope of the book:

THE OPEN COURT PUBLISHING COMPANY

378-388 Wabash Avenue, Chicago

Date.....

THE OPEN COURT PUBLISHING COMPANY

378-388 Wabash Avenue, Chicago, U. S. A.

Gentlemen:—Please send me a copy of the "SCRAPBOOK OF ELEMENTARY MATHEMATICS," for which I enclose $1.00.

.....

.....

Remittances may be made by Express or Postal Money Order, or by drafts on Chicago or New York. When paying by personal checks add 10 cents for collection charges.

Space and Geometry in the Light of Physiological, Psychological and Physical Inquiry. By Dr. Ernst Mach, Emeritus Professor in the University of Vienna. From the German by Thomas J. McCormack, Principal of the LaSalle-Peru Township High School. 1906. Cloth, gilt top. Pp. 143. $1.00 net. (5s. net.)

In these essays Professor Mach discusses the questions of the nature, origin, and development of our concepts of space from the three points of view of the physiology and psychology of the senses, history, and physics, in all which departments his profound researches have gained for him an authoritative and commanding position. While in most works on the foundations of geometry one point of view only is emphasized—be it that of logic, epistemology, psychology, history, or the formal technology of the science—here light is shed upon the subject from all points of view combined, and the different sources from which the many divergent forms that the science of space has historically assumed, are thus shown forth with a distinctness and precision that in suggestiveness at least leave little to be desired.

Any reader who possesses a slight knowledge of mathematics may derive from these essays a very adequate idea of the abstruse yet important researches of metageometry.

The Vocation of Man. By Johann Gottlieb Fichte. Translated by William Smith, LL. D. Reprint Edition. With biographical introduction by E. Ritchie, Ph. D. 1906. Pp. 185. Cloth, 75c net. Paper, 25c; mailed, 31c. (1s. 6d.)

Everyone familiar with the history of German Philosophy recognizes the importance of Fichte's position in its development. His idealism was the best exposition of the logical outcome of Kant's system in one of its principal aspects, while it was also the natural precurs r of Hegel's philosophy. But the intrinsic value of Fichte's writings have too often been overlooked. His lofty ethical tone, the keenness of his mental vision and the purity of his style render his works a stimulus and a source of satisfaction to every intelligent reader. Of all his many books, that best adapted to excite an interest in his philosophic thought is the Vocation of Man, which contains many of his most fruitful ideas and is an excellent example of the spirit and method of his teaching.

The Rise of Man. A Sketch of the Origin of the Human Race. By Paul Carus. Illustrated. 1906. Pp. 100. Boards, cloth back, 75c net. (3s. 6d. net.)

Paul Carus, the author of The Rise of Man, a new book along anthropological lines, upholds the divinity of man from the standpoint of evolution. He discusses the anthropoid apes, the relics of primitive man, especially the Neanderthal man and the ape-man of DuBois, and concludes with a protest against Huxley, claiming that man has risen to a higher level not by cunning and ferocity, but on the contrary by virtue of his nobler qualities.

THE OPEN COURT PUBLISHING CO., 1322 Wabash Ave., Chicago

Zarathushtra, Philo, the Achaemenids, and Israel

Being a Treatise upon the Antiquity and Influence of the Avesta, for the most part delivered as University Lectures.

By Dr. Lawrence H. Mills, Professor of Zend Philology in the University of Oxford, Translator of the Thirty-first Volume of the Sacred Books of the East, Author of the Five Zarathushtrian Gathas, etc. Part I.—Zarathushtra and the Greeks. Part II.—Zarathushtra, the Achaemenids and Israel. Composed at the request of the Trustees of the Sir J. Jejeebhoy Translation Fund of Bombay. 8vo. Pp. xiii, 208; xiv, 252, two parts in one volume, cloth, gilt top, $4.00 net.

Shortly before the death of Professor James Darmesteter, of Paris, the great authority on the "Zend-Avesta," he surprised the general public by changing his views concerning the antiquity of the Zoroastrian literature, maintaining that the "Gathas" were largely influenced by the writings of Philo, and were written about the beginning of the Christian era. This change of view on his part led the Parsees of India to engage Dr. Mills to write a book upon the great antiquity of the "Avesta." After several years of continuous devotion to the subject, the present volume is put forth as the result, and it amply meets all expectations. The antiquity of the Zoroastrian literature is successfully maintained, and in such a manner that ordinary readers can appreciate the argument.

"The Avesta in no sense depends upon the Jewish Greeks. On the contrary, it was Philo who was in debt to it. He drank in his Iranian lore from the pages of his exilic Bible, or from the Bible-books which were then as yet detached, and which not only recorded Iranian edicts by Persian Kings, but were themselves half made up of Jewish-Persian history. Surely it is singular that so many of us who 'search the scriptures' should be unwilling to see the first facts which stare at us from its lines. The religion of those Persians, which saved our own from an absorption (in the Babylonian), is portrayed in full and brilliant colors in the Books of the Avesta, because the Avesta is only the expansion of the Religion of the sculptured edicts as modified. The very by-words, as we shall later see, are strikingly the same, and these inscriptions are those of the very men who wrote the Bible passages. This religion of the Restorers was beyond all question historically the first consistent form in which our own Eschatology appeared" (pt. i. pp. 206-207).

The conclusions come with great force in support of the genuineness and authenticity of the biblical references to Cyrus in the Old Testament. Students of the literature of the Captivity will find the volume invaluable. The facts now brought to light are such as the literary critics cannot afford to neglect.

The Open Court Publishing Co.

1322 Wabash Avenue, Chicago

VOL. XVIII. No. 4. OCTOBER, 1908.

THE MONIST

A QUARTERLY MAGAZINE

Devoted to the Philosophy of Science

Editor: DR. PAUL CARUS. *Associates:* E. C. HEGELER, MARY CARUS

CONTENTS:

(For particulars see inside title-page.)

CHICAGO

THE OPEN COURT PUBLISHING CO.

Price, 60 cents; Yearly, $2.00

LONDON: Kegan Paul, Trench, Trübner & Co., Ltd.

In England and U. P. U., half a crown; Yearly, 9s 6d.

Entered as Matter Oct. 10, 1890, at the Post Office at Chicago, Ill., under Act of March 3, 1879.

VOL. XVIII. OCTOBER, 1908. NO. 4

THE MONIST

A BRIEF HISTORY OF EARLY CHINESE PHILOSOPHY.[1]

III. RELIGION.

I WISH, under this heading, to discuss the conception of God or Shang Ti in the Five Canonical Books (*Wu King*), especially in the Shu and the Shih, both of which can be considered to embody the gist of popular philosophy in early China. The reason why I confine myself to these classical documents is because every religious attitude manifested by the Chinese towards God is to be found in them, and I might almost say—only in them. The philosophers, on the other hand, including the Confucians, the Taoists and others, seem to have had nothing especially to do with the worship of God. In fact, there is a very definite line of demarcation between these two representative groups of writings, the classic and the philosophical treatises. The first are religious in the proper sense of the word, while the latter are practical, moral and rationalistic, or sometimes highly speculative as is the case with the Taoist books.

The earliest Chinese notion of God was more or less personal; the relation that obtained between Heaven (*T'ien*) and mankind on earth was to a certain degree intimate and mutually responsive; whenever misfortune vis-

[1] Former instalments of Mr. Suzuki's "Brief History of Early Chinese Philosophy" have appeared in *The Monist*: (1) Philosophy, in July, 1907, and (2) Ethics, in April, 1908.

ited the people they were sure to cry to Heaven as the source of mercy and repented of their wickedness. But when the philosophical mind began to make inquiries, Heaven lost its emotional, religious relations to the creatures below; for it became more and more impersonal until it finally came to represent no more than natural laws which required no special humoring, as it were. The *t'ien* came to be used in the sense of rationality and almost entirely replaced *Ti* (Lord) or *Shang Ti* (Lord on high), a term fully suggesting a personal agent.[1]

That in ancient times the Chinese had in their minds a being, or power, or even a person that governed mortals below, is gathered from the terms (Lord, August Heaven, Pitying Heaven, etc.) so liberally and religiously used in the Shu King, Shih King, Yih King, and Li Ki—especially in the first two canonical books. In what follows an attempt will be made to illustrate the attitude of the early

[1] It may not be altogether proper to consider Shang Ti as a person residing in heaven (*t'ien*). Though it is certain that he was not merely a moral power nor the personification of Heaven as some Christian missionary scholars of Chinese religion are inclined to believe, he was not a person in the fullest sense of the word. But he had something of personality in him and could properly be called "he" instead of "it." There is no doubt, however, that the early Chinese did not conceive their Shang Ti as did the Jews their Yahveh. When the Chinese spoke of Shang Ti, they had in their minds something of an august supreme being in Heaven above, who was the arbiter of human destiny, though not their creator. He did not, exactly speaking, reside in Heaven, but Heaven was his material or objective expression. Figuratively speaking, Heaven was Shang Ti, and Shang Ti was Heaven. A famous commentator to the Wu King, Lü Shih, says: "It is called Heaven (*t'ien*) when viewed from the point of its overshadowing the entire world; it is called Lord (*ti*) when viewed from the point of its rulership." Again, the author of the Lu Shih, a history of prehistoric China, says in one of his supplementary essays attached to the History: "Ti is T'ien, and T'ien is Ti. Why, are they not identical? T'ien is a general name given to primordial essence [*yüan ch'i*], while Ti is a name given to its virtue as manifested in its activities. It is T'ien when viewed from the point of its objectivity; it is Ti when viewed from the point of its rulership. When the immensity of depth, height, and expansion of the essence is considered, it is called the 'lord on high in great heaven.' When reference is made to the fact that the lords of water, fire, wood, metal, and earth abiding in different localities assume alternately the rank of leadership, we consider the Lord differentiating himself into five lordships, and he is accordingly known under five different names, which may however be comprised in the one name of Great Heaven. When sacrifices are offered to the five lords who severally assuming their celestial ranks are to be designated under one common appellation, then they are collectively known as the Shang Ti (Lord on high)."

Chinese towards this *Ti* as well as the attributes under which he was conceived.

1. In the first place, Heaven (*T'ien*) was compassionate, as is known from one of its common attributes, *min*, "pitying." Whenever the early Chinese suffered, they called upon Heaven for protection and commiseration; they found consolation in their distress by addressing Heaven as their parents. When the early Chinese settlement was still struggling hard with wild and barbarous neighbors, the San Miao tribes who rebelled repeatedly against Chinese rule, they thought it expedient to appeal to the religious sentiment of the wild Miao and to call God to their help. So we read in the "Counsels of the Great Yü," in the Shu King (Part II, Book II): "At the end of three decades, the people of Miao rebelled against the commands, when Yi came to the help of Yü, saying, 'It is virtue only that moves Heaven; there is no distance to which it does not extend. Fulness invites loss, humility receives increase,—this is the way of Heaven. In the early time of Ti[3] when he was living by Mount Li, he went into the fields, cried daily to Pitying Heaven, and to his parents, taking upon himself all guilt and charging himself with their wickedness. At the same time with respectful humility he appeared before Kû Sâu, looking grave and awe-struck, till Kû Sâu also became transformed by his example. Entire sincerity moves the spirits, how much more will it move the rulers of Miao!' "[4]

Under King Li (B. C. 878-828) of the Chou dynasty, a courtier was slandered and disgraced. He did not know where to appeal for vindication but to Heaven who looked upon human affairs with parental sympathy. He composed

[3] That is, Shun, who became the ruler of this early settlement in the year B. C. 2255.

[4] The quotations from the Shu and the Shih King are generally taken, with occasional modifications, from Legge's translations in the *Sacred Books of the East*, Vol. III.

a poem and thus addressed Heaven: "O Great and Distant Heaven, who art called our parent,[5] why should I without crime or offence suffer from disorders so great! The terrors of Great Heaven are excessive, but indeed I have committed no crime. The terrors of Great Heaven are very excessive, but indeed I have committed no offence." (Shih King, II, V, 4. Legge, p. 361.)

Mang Tze, chief of eunuchs, became a victim of slander whereat he cried to Heaven, bitterly denouncing his enemies: "The proud are delighted and the troubled are in sorrow. O Azure Heaven! Look on these proud men; pity those who are troubled." (Shih, II, V, 4.)

2. Since Heaven is compassionate, it is Heaven that showers blessings upon humankind. The early Chinese were quite simple-hearted. Whenever their hearts overflowed either in grief or in joy, they, like every other primitive people, made Heaven their last refuge. When the Chou dynasty came to full sovereignty through the successful achievements of its earlier rulers, T'ai Wang, T'ai Pe, Wang Chi, and through the subjugation of Mi and Ts'ung by King Wên, they ascribed this to the special grace of Heaven shown to the House of Chou, and for which the poet was made to sing the virtues of the kings and to thank Heaven in the following lines: "Great is the Lord on high, beholding this lower world in majesty. He surveyed the four quarters, seeking for some one to give establishment to the people. Those two earlier dynasties had failed to satisfy him with their government; so throughout the various states, he sought one on whom he might confer the rule. Hating all the great states, he turned his attention to the West, and gave a settlement [to King T'ai]." (Shih III, I, 7. Legge, p. 389.)

This idea of heavenly bliss is also expressed in a much

[5] Cf. Shu King, Part V, Book I, "The Great Declaration"; "Heaven and Earth are the parents of all creatures."

earlier ode of the Shang dynasty (B. C. 1766-1123). The piece is a sort of hymn sung to the spirit of the founder of the dynasty, T'ang the Perfect. First, it alludes to his virtuous life, offerings are made, he is asked to partake of them and to bless his descendants. Then it describes the feudal princes coming to celebrate the festival (Shih, IV, V, 2): "With the hubs of their wheels bound with leather, and their ornamented yokes, with the eight bells at their horses' bits all tinkling, [the princes] come to assist at the offerings. We have received the appointment in all its greatness, and from Heaven is our prosperity sent down, fruitful years of great abundance. [Our ancestors] will come and enjoy [our offerings] and confer on us happiness without limit."

In another ode belonging to the same period, the virtue of T'ang the Perfect is described and praised as a special blessing bestowed upon him by Heaven: "He received the tribute of the states, small and large, and supported them as a strong steed [does its burden]:—so did he receive the blessings of Heaven. He displayed everywhere his valor, unshaken, unmoved, unterrified, unscared,—all dignities were united in him." (Shih, IV, V, 4. Legge, p. 310.)

This idea of heavenly bliss is also expressed by Chou Kung in his advice to his colleague, Shao Kung, who wanted to retire from royal service. Alluding to the prosperous state which the Chou dynasty was then enjoying, the Duke of Chou says: "And the favor of Heaven has come to us so largely; it should be ours to feel as if we could not sufficiently respond to it." (Shu, Part V, Book XVI, "The Prince Shih.")

3. Not only bliss but curses come also from Heaven, when the creatures below pay no regard to the moral laws as established by it. There are numerous passages in the Shu as well as the Shih in which sufferers most pitifully appeal to Heaven for rescue, sometimes even blaming

Heaven for the misery which they endure. This is quite natural; for were it not for the existence of evils man would never become conscious of a power above him. To quote only a few of the many lamentations addressed to Heaven by the early Chinese: "Great Heaven is not just to send down these dire calamities; Great Heaven is not merciful to send down these miseries...O Unpitying Great Heaven, there is no end to disorder! With every month it continues to grow so that the people have no rest." (Shih, II, IV, 7.)[6] "Great and Far-reaching Heaven, how is it thou hast not extended thy benevolence, but sendest down ruin and famine, and bringest about desolation throughout the empire? Pitying Heaven, quickened with wrath, hast thou no discrimination, no design? Leave unpunished those who sinned, for they have already suffered for their offences. But those who are without sin are also drawn into the general misfortune." (Shih, II, IV, 10.)[7] "Shou, King of Shang, does not reverence Heaven above, and inflicts calamities on the people below....Great Heaven was moved with indignation." (Shu, Part V, Book I.)[8]

4. Heaven was thus considered to be in possession of full power over mankind. It showed mercy to those who were virtuous and obedient to the heavenly will; but woe unto those who deviated from its prescribed course; no one could resist or ignore heavenly displeasure. "The overpowering wrath of unfathomable Heaven is felt throughout the world below." (Shih, II, V, 1.)[9] "Right

[6] Legge, p. 352 ff. The poem is said to have been composed by Chih Fu, a grand officer of the Chou dynasty under King Yu (B. C. 781-771), who listened to the evil advice of his favorite mistress Yin.

[7] Legge, p. 357. The author of the poem is Chih Yu of the Chou dynasty, who wrote this, lamenting the unjustifiable action of the King and expressing his surprise at its progress unchecked by heavenly wrath.

[8] Legge, p. 125 f. From the first section of the "Great Declaration," which is divided into three. The Declaration was issued by King Wu of the Chou dynasty when he assembled his army at Mang Ching to attack Chou Hsin, the tyrant of the Shang. Some consider this spurious.

[9] Legge, p. 358. A poem written during the reign of King Yu who was notorious for his misconduct. It continues: "[The King's] counsels and plans

from the spring comes the water bubbling, revealing its depths,—sorrow of my heart! Did it start only to-day? Why not in the days before me? Why not in the days after me? Incomprehensible Heaven, far and distant, is able to strengthen anything. Do not disgrace your ancestors, but save your posterity." (Shih, III, III, 10.)[10] "If you reverently obey, Heaven will favor and compassionate you. But if you do not reverently obey, you shall not only be deprived of your lands, but I will also carry to the utmost Heaven's inflictions upon your persons." (Shu, V, XIV. Legge, p. 200.) In this passage, which is taken from Chou Kung's address to the "Numerous Officers" of the Yin dynasty which he had just overthrown, we notice his most threatening attitude toward the survivors of the preceding dynasty. This is due to the conviction that he represents in his person the authorities above, according to which he was ordered to overturn the tyrannical government of Shang. This theocratic conception is traceable throughout in the history of China, to which further reference will be made later on.

5. Owing to the fact that sinners are liable at any time to be visited with heavenly judgments, the power above had to be revered and its decrees complied with. The poet Fang Peh, of the Chou dynasty, who mourns the prevailing misery of the people suffering from the reckless policy of King Yu, strongly urges the King and his counsellors to heed the wrath exhibited by Heaven: "Revere the wrath of Heaven, and dare not to make sport or be lax. Revere the ways of Heaven, and dare not to be wild and unruly. Great Heaven is bright and is with you wherever you go. Great Heaven is clear-sighted, and is

are crooked and bad. When will an end be put to them? Good counsels are not followed; evil counsels are listened to. When I look at the counsels and schemes, I am greatly grieved."

[10] Legge, p. 429. Composed in the time of King Yu. The author evidently believes in the almighty power of Heaven who can turn misery into happiness, if the people below behaved according to his behest.

with you wherever you wander." (Shih, III, II, 10. Legge, p. 410.) In the same spirit, King Wu addresses K'ang Shu who was about to be appointed Marquis of Wei which was formerly a stronghold of the Shang dynasty: "Let us be reverent, let us be reverent. The way of Heaven is evident, and its decree is not easy to follow. Say not that it is high, high above us. It ascends and descends around these people; daily overseeing us, it is wherever we are....Oh! Fang, my little child, be reverent as if thy person were suffering from a disease; awesome though Heaven be, it yet helps the sincere." (Shu, V, IX. Legge, p. 165 ff.)

6. Heaven is not only the symbol of power and energy, but that of wisdom, bright and illuminating. "High Heaven, so bright, the earth below lies in thy illuminating survey." (Shih, II, VI, 3.)[11] "Great Heaven is exceedingly bright." (Shih, III, III, 2.)[12] "The bright and illuminating Lord on high giveth us promise of a prosperous year." (Shih, IV, II, 1.)[13] "Great Heaven is bright and is with you in all your journeys. Great Heaven is clear-sighted and is with you in all your wanderings." (Shih, III, II, 10.)

7. Being intelligent and all-seeing, what is decreed by Heaven must be carried out by man who is no more than a mere instrument. The will of Heaven once declared is irrevocable, for it is the source of the moral laws and the

[11] This is from a poem composed by a court officer engaged in a frontier war. Speaking of the hardships which he endures, he calls to Heaven that knows everything which transpires on earth, and continues: "I marched on this expedition to the West as far as this wilderness of Ch'iu. From the first to the second moon, I have passed through the heat and the cold. My heart is sad, the poison [of my lot] is too bitter. I think of those officers at court, and my tears fall down like rain. Do I not wish for home? but I dread the net of guilt."

[12] Legge, p. 416. From a didactic poem by Duke Wu of Wei in his ninetieth year.

[13] Legge, p. 321. By Chou Kung who admonishes his minister of agriculture.

standard of conduct. So, a poet[14] of the Chou dynasty again declares: "Look into the midst of the forest; there we find large faggots and small twigs. The people now in their sad condition look towards Heaven, vague and indefinite. Yet when its determination is fixed, there is no one whom it will not conquer. There is the great Lord on high, and does he hate any one?" Duke Wu of Wei makes a rejoinder to this conviction when he says, "Great Heaven never errs." (Shih, III, III, 2.)[15] And this unerring decree of Heaven was ever kept in view by a wise ruler, who would never think of doing violence to his moral conscience as an expression of the heavenly will. The Chinese government in those earlier days, and perhaps even now to a certain extent, was a theocracy. So we read in the "Instructions" given to T'ai Chia by his aged teacher minister, Yi Yin, (Shu, IV, V. Legge, p. 95 ff.): "The former king kept his eye constantly on the manifest decrees of Heaven, and so maintained the worship of the spirits of heaven and earth, of those presiding over the land and the grain, and of those of the ancestral temple;—all with sincere reverence. Heaven took notice of his virtue, and caused its great appointment to light on him that he should soothe and tranquillize the myriad regions." Again, in the "Great Announcement," which was issued by King Ch'eng of the Chou dynasty when he was at the point of undertaking a punitive expedition against some of his rebellious lords, the young king declares (Shu, V, VII): "I am the servant of Heaven, which has assigned me this great task and laid the hard duty on my person.... I the little child dare not disregard the appointment of the Lord

[14] Chia Fu lamenting the misrule of his king. (Shih, II, IV, 8. Legge, p. 354.)

[15] Legge, p. 417. The whole stanza runs thus: "Oh, my son, I have told you the old ways. Hear and follow my counsels, then shall you have no cause for great regret. Heaven is now inflicting great calamities and destroying the state. My illustrations are not taken from things remote; great Heaven never errs. If you go on to deteriorate in your virtues, you will bring the people to great distress."

on high. . . . Oh! the clearly-intended will of Heaven is to be feared, it is to help my great inheritance." (Legge, p. 159.)[16]

8. The moral relations that exist between men are so determined eternally by the ordinances of Heaven. Heaven is the source of moral authority. Those who are immoral commit sin against Heaven and cannot escape its retribution. It is always impartial and shows no favor in administering justice. So declares the poet Yin Chi Fu of the Chou dynasty in the reign of King Hsüan: "Heaven gave birth to the multitudes of the people; and wherever there are things they are governed by fixed laws. To delight in what is held by the people eternally normal, that is the highest virtue." (Shih, III, III, 6.) This notion of the heavenly origin of the moral laws is much more clearly and definitely stated in the Shu King (II, III.) by Kao Yao, minister to Shun. Kao Yao says: "It is the heavenly arrangement that we have a universal order here; and we are charged with [the enforcement of] the five orders; let us be sincere in these five. It is the heavenly ordinance that we have a regular proceeding here; and ours is to observe the five ceremonies; let us be punctual. Through universal respect and united reverence, let there be a happy concordance. Heaven favors the virtuous; and there are five habiliments; let the five be clearly distinguished. Heaven punishes the guilty, and there are five punishments; let the five be in effect. In the affairs of administration—let us be earnest, let us be earnest." (Cf. Legge, p. 55.)

9. The moral laws were thus made by Heaven, and

[16] Compare the following: "The ordinances of Heaven, how uninterrupted they are! and how unfathomable!" (Shih, IV, I, 2.) "The doings of High Heaven have neither sound nor odor. Follow the example of King Wen, and the myriad regions will repose their confidence in you." (Shih, III, I. 1.) "How vast the Lord on high! He is the ruler of men below. When in his fearful wrath, the decrees of the Lord on high are full of woes. Heaven creates the multitudes of the people, whose destinies are not uniformly determined. There are none who have not their [hopeful] start, but few are they that have a [blissful] finish." (Shih, III, III, 1.)

eternally fixed; and it was the same authority that rewarded the just and punished the unjust. For Heaven was not only the author of the laws but their executor, stern and inflexible. Therefore, whether or not the creatures here below were made happy, prosperous, and satisfied, depended upon their own conduct. If they obeyed the rules initiated by Heaven and practiced goodness (*Tê*), the Lord on high favored them; but if they did not they were sure to suffer the consequence. There was no escape from this absolute law. Therefore, we read in the Shu King (Part IV, Book IV, "The Instructions of Yi"): "Only the Lord on high is not constant: on the good-doer he sends down all blessings, and on the evil-doer he sends down all miseries. Do you but be virtuous, be it in small things [or large], and the myriad regions will have cause for rejoicing. If you be not virtuous, be it in large things [or small]; it will bring the ruin of your ancestral temple." (Legge, p. 95.) Yi Yin, the sage-minister, expresses the identical idea in his discourse on "Absolute Virtue," (Shu, IV, VI), which is also addressed to his charge T'ai Chia: "It was not that Heaven felt any partiality for the Lord of Shang; but Heaven comes to [him who practises] absolute virtue. It was not that Shang courted the favor of the lower people, but the people turned towards [him who practised] absolute virtue. Where there is absolute virtue, there is no undertaking that is not favorable. Where virtue contradicts itself, there is no undertaking that is not unfavorable. Favor or disfavor does not wrongfully fall upon men; for Heaven sends down misfortune or prosperity according to their virtue." (Cf. Legge, p. 101.) In one word, "The heavenly way is to bless the good and to curse the dissolute." (Shu, IV, III, "The Anouncement of T'ang.")

10. It thus goes without saying that Heaven knows no partiality whatever in conferring bliss or sending down

calamity. The venerable Yi Yin again instructs his young king (Shu, Part IV, Book V, section C): "Oh! Heaven knows no favoritism. Only those who are reverent are favored by it. The people have no special person whom they constantly cherish, they only cherish those that are benevolent. The spiritual beings have no special offerings which they are constant in accepting, they only accept things that are offered with sincerity. The heavenly seat is indeed difficult to hold." Later, Chou Kung also utters the same sentiment when he is about to appoint his nephew Chung Hu to Lord of Tsai (Shu, V, XVII): "Great Heaven knows no favoritism. Only those who are virtuous are helped by it. The people's hearts know no constant attachment; only they cherish those that are benevolent."

11. As Heaven shows no partiality in its dealings with the creatures below, the latter must be always on their guard so that they may not fall from the heavenly grace and suffer misery and ignominy. Heaven can never be relied upon, it is not constant, it changes as a man changes in his virtuous conduct. And it is most difficult for him to be always upright and virtuous, and not to deviate even for a moment from the path prescribed by the Lord on high. Heaven's favors are the most difficult thing to be retained by us earthly creatures. The unreliability of the heavenly will, therefore, from the human point of view is ever and again emphasized by the early Chinese moralists. Yi Yin's (who died B. C. 1713) instruction to the young king T'ai Chia repeatedly refers to this idea, he seems never tired of reminding the inexperienced lest he let loose his youthful unbridled passions in his administration, thinking that the heavenly pleasure once shown to his father is constant and eternal regardless of his own conduct. "Oh!" says Yi Yin, "it is difficult to rely upon Heaven, for its decrees are not constant. But [let a ruler] be constant in his goodness, and he will preserve his throne. Let him be inconstant in

his goodness, and the nine provinces will be lost to him." (Shu, IV, VI. Legge, p. 101.) Later, Chou Kung (d. 1105 B. C.) is also anxious to impress this idea on his colleague, Shao Kung: "The decrees of Heaven are not easily preserved, Heaven is difficult to be depended upon." (Shu, V, XVI; Legge p. 206.) In the Book of Odes we find Chou Kung again referring to the utmost difficulty of securing the heavenly grace; for he sings in his commemoration of the father Wen (Shih, III, I, 2): "The bright illumination [of virtue] here below; the stern authority [of God] there above. Heaven is not readily to be relied upon; it is no easy task to be a king. Yin's rightful heir to the heavenly seat was not allowed to govern the four quarters.... The King Wen gloriously served the Lord on high with watchfulness and reverence, and thus won numerous blessings. Since his virtue was never reversed, he enjoyed the allegiance of the states from all quarters.... The troops of Yin Shang assembled like a forest and marshalled on the wilds of Mu. We rose thereupon and [Shang Fu cried to the King Wen], "The Lord on high is with thee, be not faint-hearted!'"

* * *

From these statements, it is apparent that the Chinese conception of God in this Ante-Ch'in period was of a very high order; and at the same time the fact will strike an observant reader that the Chinese God is different in one essential point from the Hebrew God, in that it betrays no such personal intimacy as the latter in the Old Testament. The Chinese are not such an intensely religious and fanatical people as the Hebrews, and naturally their conception of the highest authority of moral laws was not so personal and intimate as that of the Jews, though Shang Ti was personal enough in certain respects. Even in their most religious documents in the Shu King, they seem never to

have given rein to their imagination so far as to depart from the bounds of common-sense morality. This will be shown in the following "Announcement of T'ang," who founded the Yin dynasty (B. C. 1766-1154). This imperial manifesto was issued by T'ang to justify himself before his subjects in the overthrow of the preceding dynasty and in the establishment of his own,—a procedure sanctioned by Heaven.[17] In this we see the elevation of its moral tone, but not any particularly religious fervor. After T'ang had made an end of the Hsia dynasty and returned to Po, he issued this announcement, a solemn inauguration of the new dynasty: "Ah! Ye multitudes of the myriad regions, listen clearly to the announcement of me, the One Man. The Great God has conferred [even] on the inferior people a moral sense, compliance with which would show their nature to be invariably right. To make them tranquilly pursue the course which it would indicate, is the work of the sovereign.

"The king of Hsia extinguished his virtue, and played the tyrant, extending his oppression over you, the people of all the clans from myriad regions. Suffering from his cruel injuries, and unable to endure the bitterness and venomousness, you, the people of all the clans from myriad regions, with one accord protested your innocence to the spirits of Heaven and Earth. The way of Heaven is to bless the good and make wretched the dissolute. It sent down calamities on Hsia, to make manifest her guilt.

"Therefore I, the little child, charged with the decree of Heaven and its evident terrors, did not dare to pardon [the criminal]. I presumed to use the dark-colored victim-bull, and, making clear announcement to the spiritual sovereign in the high heavens, requested leave to deal with the ruler of Hsia as a criminal. Then I sought for the

[17] This justification was later subscribed to by Confucius who says in one of his commentaries on the Yih King that "The revolution of T'ang and Wu was in accordance with Heaven and in harmony with men."

great sage, with whom I might unite my strength, to request the favor [of Heaven] for you, my multitudes.

"High Heaven truly showed its favor to the people below, and the criminal has been degraded and subjected. What Heaven appoints is without error; — brilliantly [now], like the blooming of plants and trees, the millions of the people show a true revival.

"It is given to me, the One Man, to secure the harmony and tranquility of your states and clans; and now I know not whether I may not offend against [powers] above and below. I am fearful and trembling, as if I were in danger of falling into a deep abyss.

"Throughout all the regions that enter on a new life under me see that ye follow not lawless ways; make no approach to insolence and dissoluteness; let every one be careful to keep his state; that so we may receive the favor of Heaven. The good in you, I will not dare to keep concealed; and for the evil in me I will not dare to forgive myself. I will examine these things in harmony with the mind of the Lord on high. When guilt is found anywhere in you who occupy the myriad regions, let it rest on me, the One Man. When guilt is found in me, the One Man, it shall not attach to you who occupy the myriad regions.

"Oh! let us attain to sincerity in these things, and so we shall likewise have a [happy] consummation." (Shu, Legge, p. 89 *et seq.*)

The Chinese God was not the God of the Psalms nor of Job; he was a quiet, deliberate, ethical power that discharged or exercised his function rather impassively. He never showed himself in the midst of fires, thunders, or lightnings to vent his personal ire upon the creatures below. The Chinese never caught a glimpse of their God. He was hidden far up in the azure skies, he could not be brought into an immediate personal touch with mortals. His presence could only be inferred through the manifestations of

his power; that is, through extraordinary natural phenomena. When he was indignant, he visited all kinds of calamity upon the misguided. So we read in the Shih King (III, III, 3): "Heaven is sending down death and desolation, and has put an end to our king. It is [now] sending down those devourers of the grain so that the husbandry is all in evil case. Alas for our Middle States! all is in peril and going to ruin. I have no strength [to do anything], I but think of the power in the azure vault." Again: "Bright was the Milky Way, shining and revolving in the sky. The King said, 'Oh! What crime is chargeable to us now, that Heaven sends down death and desolation? Famine comes again and again. There is no spirit I have not sacrificed to, there is no victim I have grudged. Our jade symbols, oblong and round, are exhausted;—how is it that I am not heard?.... The drought is excessive, and I may not try to excuse myself. I am full of terror and feel the peril, like the clap of thunder or the roll. Of the remnant of Chou, among the black-haired people, there will not be a half man left, nor will the Lord on high in great Heaven exempt me. One and all, shall we not dread this? Our ancestors will be without successors.' "[18]

These calamities came down from Heaven on account of human wickedness. The cry of the suffering is piteous enough, and if this were raised to Yahveh, it is highly probable that he would listen to it and make a personal communication with his creatures below. But the Chinese God in great Heaven which is far extending,[19] veiled in obscurity,[20] and has no sound nor odor,[21] is altogether irresponsive; he seems to be not immediately concerned with human affairs, at any rate not so personally as the Judaic

[18] Shih, III, III, 4. The drought occurred in the sixth year of King Hsüan of the Chou dynasty. He reigned B. C. 827-781.

[19] Shih, II, V, 4; II, IV, 10, etc.

[20] Shih, II, IV, 8; III, III, 10, etc.

[21] Shih, III, I, 1.

God, who "thundereth marvelously with his voice," who "saith to the snow, Be thou on the earth; likewise to the small rain, and to the great rain of his strength," and again who "sealeth up the hand of every man; that all men may know his work" (Job, xxxvii. 5-7). Such a God as this was not in accord with the Chinese imagination.

Though lacking in religious fervor, the Chinese God. besides being a stern moral power, was a political director, whose foremost object of administration was to give his people happiness, peace, and justice. When Heaven found its earthly representative who is called the "son of Heaven" unworthy of his exalted position, it appointed some one else from among the people. This new representative, conscious of his holy mission, gathered about him all the available forces to rise against the prevailing house. He would recount all the outrageous, inhuman sins committed by the tyrant, and in them would seek the justification of his action as heaven-ordained. The "Great Declaration" (Shu, V, I) by King Wu of the Chou dynasty, though by some considered spurious, fairly illustrates the attitude of a new dynasty against its corrupt, degenerate predecessor. He declares: "Heaven-and-Earth is the parent of all creatures; and of all creatures man is the most highly endowed. The sincerely intelligent [among men] becomes the great sovereign; and the great sovereign is the parent of the people. But now Shou, the king of Shang, does not reverence Heaven above, and inflicts calamities on the people below. Abandoned to drunkenness and reckless in lust, he has dared to exercise cruel oppression. He has extended the punishments of offenders to their relatives. He has put men into offices on the hereditary principle. He has made it his pursuit to have palaces, towers, pavillions, embankments, ponds and other extravagances, to the most painful injury of you, the people of myriad regions. He has burned

and roasted the royal and good. He has ripped up pregnant women.

"Great Heaven was moved with indignation, and charged my deceased father Wen to display its terrors; but [he died] before the great work was completed. On this account, I, Fa, the little child, have by means of you, the hereditary rulers of my friendly states, contemplated the government of Shang; but Shou has no repentant heart. He sits squatting on his heels, not serving the Lord on high nor the spirits of heaven and earth, neglecting also the temple of his ancestors, and not sacrificing in it. The victims and the vessels of millet all become the prey of robbers, and still he says, 'The people are mine; the [heavenly] appointment is mine,' never trying to correct his contemptuous mind.

"Heaven, for the help of the people below, made for them rulers, and made for them instructors, that they might be able to be of service to the Lord on high, and secure the tranquillity of the four quarters [of the empire]. In regard to deciding who are criminals and who are not, how dare I give any allowance to my own wishes?

" 'When the strength is the same, measure the virtue [of the parties]; when the virtue is the same, measure their righteousness!' Shou has hundreds of thousands and myriads of officers, but they have hundreds of thousands and myriads of minds; I have [but] three thousand officers, but they have one mind. The iniquity of Shang is full. Heaven gives command to destroy it. If I did not obey Heaven, my iniquity would be as great.

"I, the little child, early and late am filled with apprehensions. I have received the command of my deceased father Wen; I have offered special sacrifice to the Lord on high; I have performed the due services to the great earth, and I lead the multitudes of you to execute the punishment appointed by Heaven.

"Heaven compassionates the people. To what the people desire, Heaven will be found to give effect. Give ye aid to me, the One Man, to cleanse forever all within the four seas. Now is the time. It should not be lost." (Legge, p. 125 *et seq.*)

The Shih records how Heaven appointed King Wen to take measures against the tyrant of Shang, whose atrocious deeds are enumerated in the above "Declaration." "The Lord on high said to King Wen, 'I am pleased with your intelligent virtue, not loudly proclaimed nor portrayed, without extravagance or changeableness, without consciousness of effort on your part, in accordance with the pattern of the Lord on high.' The Lord on high said to King Wen, 'Take measures against the country of your foes. Along with your brethren, get ready your scaling ladders, and your engines of onset and assault, to attack the wall of Ch'ung.'" (III, I, 7.)

The Chinese did not make any distinction between moral and political authority. Whoever is able to govern the people must be a man of moral perfection; and whoever is perfect in his goodness is entitled to a rulership; for the highest position in the state belongs to the one who is nearest to the Lord on high. In this, the Chinese conception of rulership may be considered somewhat akin to that of Plato who conceives the state as a sort of great ethical institution in which the morally perfect and philosophically great must lead the masses.

When any rebellious uprising was not necessary to enforce the heavenly order of things against a despot, it was the wont of a perfect, virtuous ruler to select the wisest and most virtuous of his subjects as his own successor. In this way, Yao raised Shun to the highest office in the state, and Shun in turn selected Yü to succeed him. The occupation of the throne thus effected was ascribed to the heavenly will as we read in "The Counsels of the Great

Yu" (Shu, II, II), in which the minister Yi praises the virtue of Yao: "Oh! the virtue of the Divine Yao is vast and unceasing. It is holy, spirit-like, awe-inspiring, and refined. Great Heaven regarded you favorably and ordained you to hold all the four oceans and to become the ruler of the empire."

Therefore, it was natural that every dynastic change was considered by the Chinese a decree of Heaven that wanted to discontinue its favor once so generously bestowed upon the declining dynasty and to have it transferred to the rising one which has proved its virtue and ability to carry out the appointment by the Unknown. The declining house showed by its very decline that it was no longer able to maintain effectively the right entrusted to it by Great Heaven. The disintegration that had been going on was no more than the punishment from above, and so long as they could not be made to become conscious of the fact and continued to aggravate the wretched condition of affairs, their punishment was completed by the total overthrow of the reigning government by the one which was to succeed it.

It was in accordance with this spirit that the Duke of Chou made the following declaration to the officers of the Yin dynasty which he overthrew (B. C. 1122): "Ye numerous officers of the Yin dynasty, great ruin came down on Yin from the cessation of forbearance in pitying Heaven, and we, the lords of Chou, received its favoring appointment. We felt charged with the manifest wrath of Heaven, carried out the punishment which came from a superior, and rightfully disposed of the appointment of Yin, thus finishing [the will of] the Lord on high. Now, ye numerous officers, it was not our small state that dared to attack the appointment of Yin, but Heaven was not for Yin, for indeed it would not strengthen the disorderly [government of Yin]. But it helped us. Did we dare to seek the office of

ourselves? Only the Lord on high was not for Yin as was gleaned from the doings of our common people in whom is seen the manifest wrath of Heaven." (Shu, V, XIV; Legge, p. 196 ff.)

As I stated before, the Chinese Shang Ti never made any direct personal demonstration of his will before the people, though the latter felt intimate enough toward him as they generally appealed to him as the last resort. Whatever displeasure or wrath he felt was only indirectly communicated through such inanimate mediums as drought, famine, epidemics, or earthquake, and especially through the doings and feelings of the common people, which a wise ruler is always anxious to read correctly. Heaven utters no word, but through the people. Its ever-persistent will is to bring peace and good-will and righteousness here below; and when the ruler fails to execute this order to the satisfaction of the masses and instead endeavors to promote his personal selfish interests, the people grow uneasy, disorder begins to prevail, a clamor goes up from the suffering, extraordinary phenomena take place, and herein the wise read symptoms of heavenly displeasure. "Heaven sees as the people see, Heaven hears as the people hear." (Shu, V, I). "As Heaven has mercy upon the people, whatever is desired by them is always granted." (Shu, V, I, *a*.) Again, "Heavenly intelligence is shown in the intelligence of the people, and the manifestation of heavenly wrath is shown in the manifestation of the wrath of the people." (Shu, II, III.) The relation between the two, above and below, is so intimate that when one is affected the other is sure to feel it. Therefore, whenever there is a manifestation of unrest among the masses, the wise and virtuous know that the heavenly appointment of the prevailing dynasty is being revoked, and they bide their time to rise against it when all hopes for its regeneration or reformation are gone. *Vox populi, vox dei,* was the motto

of the Chinese. Much of the Chinese democracy that prevails in spite of an autocratic form of government, is certainly due to the conception of the divinity of the popular will.

The *vox populi* was not, however, the only means to ascertain the heavenly will. There was another indication of it—divination. When divination and the reading of the popular will agreed, the wise knew conclusively where lay the heavenly will, and did not hesitate to carry this out through every means within their power. When King Ch'ang of the Chou dynasty started on his punitive expedition against the tyrant of Shang, he divined by the great tortoise-shell bequeathed to him by his father, King Neng, whether the great undertaking he was about to execute were in accord with the heavenly pleasure and could be brought to a successful end. (Shu, V, VII; Legge, pp. 157-158.) Having obtained a favorable response, he issued "the Great Declaration" to his fellow-dukes and kings as well as to his own people.

When Shun wanted to select his royal successor, he had recourse to divination, though his mind was first made up as to who it should be. To the protestation of great Yü, that the Divine Shun should, before selecting his successor, "submit the meritorious ministers one by one to the trial of divination and let the favorable indication be followed," the Divine Shun replied, "According to the rules for the regulation of divination, a person should first make up his mind and then refer his decision to the great tortoise-shell. My mind therefore was first made up. I consulted and deliberated with every one of my people who all agreed with me. The spiritual beings indicated their approval, the tortoise-shell and divining stalks concurred. Divination, when lucky, should not be repeated.... The manifest appointment of Heaven is on thy person, and thou art even-

tually to ascend the sovereign seat." (Shu, II, II; Legge. p. 50 f.)

In "The Great Plan" (Shu, V, IV, ch. 7), we read how divination by the tortoise-shell and the stalks of milfoil is to be resorted to in the settlement of doubts. The philosophy of divination is that of the Yih King, for which see Part I of this series of articles.

Thus it is evident that Shang Ti was the supreme power that guided and controlled the destiny of the people below. It was the moral authority of the universe, and its will, in whatever way manifested, either through public opinion or divination, was absolute. The only way to court its favor was to be morally upright and humane. It never showed any personal favoritism. In this can also be seen the peculiarly practical turn of the Chinese mind. Their Shang Ti was the God of monotheism as much as the Yahveh of the Jews; but as I have repeatedly remarked, Shang Ti never entered into such an intimate relationship with mortals as did Yahveh. The Ti was a somewhat impersonal moral principle, though not without some of the human passions as when he showed his wrath through famine and desolation. However this may be, the Chinese conception of Shang Ti was free from the elements of poetical or mystical imagination. He never revealed himself on a certain sacred spot on earth, nor in any material, objective form that could be perceived by the human senses. No Chinese sages ever heard his "still small voice." There was no Moses, no Abraham, no Aaron; but Shun, Yü, Yi Yin, T'ang the Perfect, Duke of Chou, and Confucius. Theophany was unknown in China. In short, Chinese imagination could not conceive the utility of the prophet or seer. It is true that the voice of Shang Ti is sometimes represented as having spoken to the mortal ear, but we are always kept in the dark as to his method of communi-

cation, if not through strange natural events,[22] or *vox populi*, or divination. He never manifested himself even in dreams or visions.

The early Chinese, however, seem to have made a distinction between Ti and T'ien. Though of course this distinction was not clearly defined, Ti appears to have been understood more personally than T'ien. This would at once be felt when Ti is translated into English by "Lord" or "God," while T'ien is rendered "Heaven." About the time of Confucius, or even as early as when the first part of the Yih King Commentaries was written, the significance of Ti was almost lost sight of, while T'ien came to occupy the more important place in the religious system of China. In other words, Shang Ti came to be regarded purely as a moral principle or reason of the universe. The most efficient and practical and religious way of serving it was to put all its moral laws such as the five Eternal Codes into practice, and did not necessarily consist in offering prayers or singing hymns or sacrificing victims to an imaginary, invisible presence that at best had no immediate personal relationship to the world below. The heavenly way was the human way. It was thus that the early religious conception of Shang Ti became gradually metamorphosed into

[22] Hsün Tze was a very practical and unimaginative thinker. Note what he says about strange phenomena of nature which the early Chinese people thought were expressions of Heavenly indignation: "The stars are falling, the trees are roaring, and the people of the kingdom tremble with fear. What would this signify? It does not signify anything. It is a natural disturbance caused by the Yin and Yang, and occurring at irregular intervals. It is rational to wonder at it, and irrational to fear it. Such things as the eclipses of the sun or moon, unseasonable storms, or the frequent appearance of strange stars, —such things occur in every generation. If the ruler is enlightened and his government is honest, however often such events may take place, he cannot be hurt. If the ruler is benighted and his government is disorderly, even if there may take place no such things, he is of little account. Therefore, the shooting of stars, or the roaring of trees, is no more than a mere natural disturbance, caused by the Yin and Yang, and occurring at irregular intervals. It is rational to wonder at it, but irrational to fear it." (Ch. XVII, "On Heaven.")

Compare this with the almost religious attitude of Confucius toward unusual natural happenings such as violent thundering or hurricanes, as recorded in the Analects.

the purely philosophical principle of T'ien and then finally into the ethical idea of Tao.[23]

Another peculiar feature of the Chinese worship of Shang Ti, which must not escape our consideration here, was that there was no popular temple dedicated to him where Heaven-fearing souls might come and offer prayers and ask special grace from above. The worship of Shang Ti was solely a state affair entrusted to a ruler personally, who by virtue of heavenly appointment was the only authorized personage sacred enough to conduct the ceremony of worship. It was the ruler himself and nobody else who could offer the annual sacrifice to Shang Ti, could give him thanks for whatever he did for the reigning house or the people in general. This was one of the most important imperial functions, the neglect of which might incur a heavenly displeasure and result in a grievous catastrophe to the kingdom. Indeed, it was thought sacrilegious for the masses to worship Heaven,[24] who was too sacred, too

[23] The following passage from Hsün Tze (Chapter XVII, on "Heaven") will show what a prosaic and practical conception of Heaven the author had; and when we compare this with the attitude of the Five Canonical Books towards Heaven, which was highly religious and reverential, we can at once feel the gap that came to exist between the canonical writers and the philosophers. Says Hsün Tze: "The working of Heaven is constant; it does not exist for Yao, nor does it disappear for Hsueh. When a man responds to it with order, there is luck; when he responds to it with disorder, there is evil. When he strengthens the foundation and is economical in expenditure, Heaven cannot make him poor; when he takes the proper nourishment and exercises himself regularly, Heaven cannot make him ill; when he is single-hearted in practising what he ought to, Heaven cannot do him any harm. Therefore, such a one cannot be made by rain or drought to suffer hunger or thirst, cannot be made by cold or heat to suffer sickness, cannot be made by evil spirits to suffer misfortune.

"When a man, however, neglects the foundation and is extravagant in expenditure, Heaven cannot make him rich; when he does not take sufficient nourishment and does not exercise himself frequently enough, Heaven cannot make him healthy; when, deviating from the course which one ought to follow, he wanders about irregularly, Heaven cannot make him happy. Therefore, such a one will suffer hunger before a drought or rain comes; he will be sick before the cold or the heat is yet threatening; he will be miserable before evil spirits visit him.

"Peace is gained by opportuneness and not by evil procedure; there is no reason to blame Heaven, for it is as it ought to be. Therefore, one who has a clear understanding of the distinction between heavenliness and humaneness, is called the perfect man."

[24] The reason why the common people were not allowed to worship the Shang Ti individually and why the ruler himself did not worship him more

divine, too holy to be so familiarly approached by them who were in fact nobodies in the eyes of the Lord on high. Not only that the worshiping of God by the common people, even by feudal lords, was an act of usurpation upon the inviolable right or duty of the reigning sovereign, but he was the mediator between Heaven and the people. Though Heaven communicated its indignation through the feeling of the multitudes of the people, it was only one man who was permitted to reflect on it and take the proper course to appease the heavenly wrath. When this one man was successful in his reflection or interpretation as well as in his undertaking, he was said to have been truly appointed by Heaven. Ever after this, he would never think of neglecting either the annual celebration of Shang Ti, or offering sacrifices on all great state occasions. As we read in the Shu King and the Shih King, the omission of this sacred and exclusive duty on the part of the occupant of the heavenly seat was counted among the grave offences which merited his overthrow by some more popular and virtuous political leader. This peculiar relation of Shang Ti to the creatures below is due to the fact that the Chinese did not conceive their Ti in his individual relation to mankind generally. The supreme one commissioned the earthly ruler with the office of looking after the welfare, moral and physical, of the masses. The latter, therefore, had nothing to do individually with the highest authority himself. It was sufficient for them if they obeyed the state regulations and acted according to the moral laws conceived as eternal and unchangeable. Of course, they had their ancestors to remember, to revere, and to keep supplied with sacrifices, but this was practically all that the common people had to

frequently, is partially seen in the following passage from the Li Ki (Book XXI): "Sacrifices should not be frequently repeated. Such frequency is indicative of importunateness, and importunateness is inconsistent with reverence. Nor should they be at distant intervals. Such infrequency is indicative of indifference, and indifference leads to forgetting them altogether." (*S. B. E.*, Vol. XXVIII.)

do in the way of religion, all their other doings being strictly moral, practical, and secular.

From the earliest time in the history of Chinese civilization, Shang Ti seems to have been associated with the state as such and not with individuals. And as the state was no more than its ruler himself in those days, the latter always assumed the duty to worship Shang Ti and to offer him the proper sacrifice in the proper season. In the great Chinese encyclopædia, *Ku Chin T'u Shu Chi Chêng* (section "Natural Phenomena," chapter "Spiritual Beings and the Miraculous," vol. IX), we notice reference to the facts that Huang Ti Yu Hsiung Shih in ancient times worshiped Shang Ti in a specially built temple, that Chuan Hsü Kao Yang Shih composed a piece of music called Cheng Yün on the occasion of a sacrifice to Shang Ti, and that later Ti K'u Kao Hsin Shih built a sort of artificial hill in the southern field, where he worshiped Shang Ti, the sun, moon, constellations, and his ancestors. The Shu King, the Chou Li (records of the rituals of the Chou dynasty), and also the Li Ki contain various statements referring to the state worship of Shang Ti on certain occasions. These facts are confirmed by the Yih King where (Appendix II) we read: "Thunder issues from the earth; it reverberates, which indicates the trigram *Yü*. The ancient kings, in accordance with this, composed music, and honored virtue, and offered it magnificently to the Lord on high, while their ancestors and their father were made to share [at the service]." Further, under the trigram *Hwan*, we read: "Wind moves over water, which is *Hwan*. The ancient kings, in accordance with this, offered sacrifice to the Lord on high and builded the ancestral temple."

All this clearly shows that from ancient times the worship of Shang Ti was one of the great state affairs which did not concern the people below. In this connection it may

be interesting to note that music was offered to Shang Ti, but no hymns singing of his virtue, power, or mercy.

This peculiar relation of Shang Ti to the people in general is very significant when we consider that he was not the creator of the universe. The early Chinese world-conception was wavering between monotheism and polytheism. It sometimes looked as if it advocated one Shang Ti, and then it fell back upon polytheistic belief, allowing besides Shang Ti in Great Heaven the terrestrial god, the five gods of water, fire, wood, metal, and earth, the mountain gods, and the river gods. But these latter were more or less subordinate to Shang Ti who apparently occupied the foremost and highly important position in the hierarchy of the gods, though the exact relation among themselves was left undefined. At any rate, this phenomenal world was not the sole work of Shang Ti in heaven, but a combined undertaking to which the Earth contributed a great deal of its energy. Therefore, in the Chinese mind heaven and earth are very closely associated, so closely indeed that they sometimes form one idea as heaven-and-earth. We can say, however, that a dualistic conception of the world either in the popular mind or in philosophy was a most predominant note throughout the history of Chinese thought, not only in its earliest stage but even when the Chinese mind reached its maturity during the Sung dynasty.

However that may be, this creation, as it were, by heaven-and-earth did not have any particularly well-defined purpose; there was not visible in it any strong predominating will.[25] True, things were regulated according to rules,

[25] The Chinese poets and philosophers were not altogether unconscious of a predominating will in the universe, which is beyond human control; but this consciousness did not play a very important part in their emotional life. As a typical instance of the Chinese philosophical attitude towards the universal will, here is a passage quoted from Chwang Tze: "Tze Lai fell ill and lay gasping at the point of death, while his wife and children stood around him weeping. Li went to ask for him and said to them, 'Hush! Get out of the way! Do not disturb him in his process of transformation.' Then, leaning

the universe was surely law-abiding, well-regulated, and by no means chaotic; but these laws were not animated with the presence of a special soul or spirit, which was powerful and active enough to impress itself upon the Chinese imagination. Being singularly practical and positivistic, the latter did not go beyond the boundary of its prosaic observation. There was no need for it to find creatorship in Shang Ti, and as soon as its worship was taken up by the king as his most solemn duty, the people and the philosophers turned their attention to another direction where Shang Ti did not make himself obtrusive.

DAISETZ TEITARO SUZUKI.

LONDON, ENGLAND.

against the door, he spoke to him [the dying friend]: 'Great indeed is the author of transformation! What is he now going to make of you? Where is he going to take you? Is he going to make you the liver of a rat? or is he going to make you the arm of an insect?' Tze Lai said, 'A son's relation to his parents is such that whenever he is told to go, whether east, west, south, or north, he simply obeys the command. A man's relation to the Yin and Yang is more than that to his parents. If they are hastening my death, and I do not obey, I shall be considered unruly.

"'Now, there is the Great Mass, that makes me carry this body, labor with this life, relax in old age, and rest in death. Therefore, that which has taken care of my birth is that which will take care of my death.

"'Here is a great founder casting his metal. If the metal, dancing up and down, should say, "I must be made into a Mo Yeh [a famous old sword]," the great founder would surely consider this metal uncanny. So, if merely because one has once assumed the human form, one insists on being a man, and a man only, that author of transformation will be sure to consider this one uncanny. Let us now regard heaven-and-earth as a great melting-pot and the author of transformation as a great founder; and wherever we go, shall we not be at home? Quiet is our sleep, and calm is our awakening.'" (*S. B. E.*, Vol. XXXIX, p. 249.)

MEDIÆVAL OCCULTISM.

RECENT students of psychology will be familiar with the extension of the Nancy suggestion theory to many branches of psychic life which previously were greatly misunderstood. It has become possible to replace the downright scepticism of the late eighteenth and early nineteenth centuries by a sympathetic but critical treatment of belief and cult.

Although it is an exceedingly difficult matter to deal with this subject by reason of the prejudices within and without the inquirer there seems to be little doubt that within a few years it will be generally recognized that all forms of cult are simply suggestive processes tending to produce assent to and realization of certain beliefs.[1]

Closely associated with religious cult is the magical cult, differing only from the first in its objective. The priest or devotee aims at communing with unseen powers for the purpose of developing his own and other beings to a comparable stature. The magician aims at communing with unseen powers for the purpose of gratifying certain desires, generally relating to power or knowledge. Should those desires be of a high ethical character, his function becomes almost identical with that of the priest. There is no essential difference between a religious man who prays for the recovery of one sick and the white magi-

[1] Regnault, *Hypnotisme: Religion*, Paris, 1897.—Regnier, *Hypnotisme et croyances anciennes*, Paris, 1891.—Skepto, *L'hypnotisme et les religions*, Paris, 1888.—Liébault, *Therapeutique suggestive*, Paris, 1891.

cian who invokes good spirits to produce the same result. In the Eastern religions this is generally recognized, but in the West the logical fallacy of differentiating between the priest and the magus is overlooked, except among a few sects, such as the Christian Scientist.

If attention be given to the history and doctrines of the oldest branch of the Christian Church it will be noticed that

1. Several of its functions are distinctly magical[2] in character,
2. It has always vigorously opposed itself to anything in the nature of non-ecclesiastical magic, this opposition being in the earlier times accounted for by the demoniacal theory of magic, and in more recent times by statements as to its unreality.[3]

The Sacraments especially come within the definition of magical functions. In each case by a ceremony employing recognized magical methods, i. e., suffumigations, incantations, exorcisms and conjurations, there is created a magical sympathy or association of ideas. Thus Baptism forms a mystic link between the Supreme and the infant soul. Confirmation revives and strengthens this link at years of discretion, Ordination supplies an even more intimate bond between the Supreme and the priest, Marriage unites two souls, Penance repairs the link severed by sin, the Eucharist is the great and mysterious communion of the Individual with the Supreme, and Extreme Unction is the final coupling of the soul to the Supreme *in articulo mortis*.

Throughout the processes are suggestive.

Firstly, there is, as far as may be, a general body of thought which suggests continuously assent to a realization of these beliefs.

[2] It will be understood that the word "magical" is used in the sense in which it is employed by Tylor, Fraser and other modern authorities.

[3] Compare the Encyclical of 1856 against Animal Magnetism.

Secondly, the devotee makes a solemn declaration of his belief (*Credo*), thus tending to crystallize the general concept.

Thirdly, by a series of hymns (incantations) and prayers (conjurations) the mind is concentrated and the attention is fatigued.

Fourthly, by fumigation and artistic and musical aids, a nervous exaltation ("inhibition" would be the preferable word) is produced.

Fifthly, an environment is formed directly suggestive of the beliefs, and

Sixthly, a consummating act (Consecration) or *Grande suggestion*, completes and centralizes the ceremony.

It should here be mentioned that the author expresses no opinion as to the inherent truth of the dogmas concerned. These can be but types of inexpressible and unknowable matters, and their truth is irrelevant to the subject of inquiry, which is simply as to the function of the cult. Moreover similar cults attach to utterly diverse dogmas.

All that the author attempts to establish is the proposition that *"Ritual is a suggestive series of acts, and as such is conformable to the laws of Suggestion."*

Passing now to non-ecclesiastical forms of suggestion, which are more particularly describable as magic, we find three classes:

1. Ceremonial magic (Fr. *La haute magic*, Ger. *Zauberei*).
2. Witchcraft (Fr. *Sorcellerie*, Ger. *Hexerei*).
3. General magical practices of a minor character.

The first (theurgic or white magic) is that to which it is proposed to devote particular attention. Witchcraft or goëtic magic seems to have been a mere travesty of the preceding, practised by the half-educated and depending for its efficacy upon the nervous susceptibility of the ig-

norant. The third class includes all those lesser practices adopted by superstitious people, such as pointing for the *mal occhio* or the like.

The author ventures to think that theurgic magic has a claim to serious consideration for the following reasons:

1. It possesses an extensive and well-written literature.
2. It claimed the attention and respect of many men of acknowledged intelligence.
3. It bears when examined a very intimate relation to religious cult and "suggestion."

It is not proposed to give here details of the literature, as there are many bibliographies. Horst's *Zauberbibliothek,* Agrippa's *De Occulta Philosophia,* Solomon's (pseudonym) *Clavicula,* Peter D'Abano's *Heptameron,* Levi's *Dogme et rituel de la haute magie* and the *grimoires* will supply a fully sufficient source of information on the subject.

Before giving details of the analogies to religious cult and hypnotic practice, the following examples of exorcisms from a *grimoire* and a missal respectively may be appropriately quoted:

"I conjure thee, O Book, to be useful and profitable to all those who shall read thee, for the successful issue of their affairs. I conjure thee by virtue of the blood of Jesus Christ contained daily in the chalice, to be useful to all those who shall read thee. I exorcise thee in the name of the most holy Trinity."[4]

"I exorcise thee, O Water, created for our service, in the name of God the Father Almighty, in the name of our Lord Jesus Christ His Son, and by virtue of the Holy Ghost;

[4] "Je te conjure, Livre, d'être utile et profitable à tous ceux qui te liront pour la réussite de leurs affaires. Je te conjure de rechef (sic), par la vertu du sang de J. C. contenu tous les jours dans le calice, d'être utile à tous ceux qui te liront. Je t'exorcise au nom de la très-sainte Trinité." *Grimoire* of Pope Honorius (pseud.) 1760.

to the end that by this exorcism thou canst banish and drive away all the forces of the enemy and banish himself together with his apostate angels: by the power of our Lord Jesus Christ Himself, who will come to judge the living and the dead, and the world by fire."[5]

Similar examples abound, demonstrating either that the magical books were composed on the basis of the missals, or that the magicians realized the identity of their proceedings with those of the priests. In other words, the magical and religious cults are identical in character, differing only in purpose.

In the *Clavicula Salomonis* (10862 Addison MS) Book i, Cap. iv, will be found a confession which although far more ample is identical in style with the *Confiteor*.

A careful study of the methods employed for evoking spirits (good and bad) in the last mentioned book and others of a similar character shows the same analogies.

After minute instructions as to the periods of fasting and abstinence, vestments and so on, differing but little from the usual preparations of a religious ascetic we have a solemn confession, an invocation to the Supreme for absolution, and solemn prayers.

In nearly all cases a "circle" is formed, presumably to limit and define the magical environment and prevent the attention wandering to external objects. To further this end, it is generally advised to use a place which shall be as far as possible devoid of interfering or disturbing influences, thus:

"And thou shouldst inviolably observe, that wishing to invoke the Spirits, either by day or by night, it is necessary that it should be done in a place hidden, removed, secret,

[5] "Je t'exorcise, Eau créée pour notre usage, au nom de Dieu le Père tout puissant, au nom de notre Seigneur J. C., Son Fils, et par la vertu du Saint Esprit; afin que par cet exorcisme, tu puisses servir à chasser et à dissiper toutes les forces de l'ennemi et l'exterminer lui-même avec ses anges apostats: Par la puissance du même N. S. J. C. qui viendra juger les vivans et les morts et le monde par feu." *Paroissien à l'usage de Versailles*, 1835.

convenient, and proper for such art, where no man frequenteth or inhabiteth, as we shall relate more fully in its place."[6]

An environment is further built up by employing symbols associated definitely with the nature and object of the conjuration, and by an astrological scheme of chronology, the time and place are suited by a strong association of ideas with the operation to be performed.

The practice in the churches of adopting definite days for various ceremonies associated by tradition with the quasi-historical types of the ceremonies is strictly analogous.

There is thus built up in the mind of the magus a complete association of ideas with the purpose of the operation.

Thus in Eliphaz Levi we are told that in invoking the spirit of a departed friend, his portrait and personal relics should be arranged in his room in the manner most provocative of familiar associations.

Wearying and reiterated incantations and suffumigations follow, producing nervous excitement and presumably eventually a form of hypnosis. At the same time by repeating the names of the Deity and various angels, the idea of spiritual communion is continuously suggested. It is perhaps noteworthy that the magical books exhibit a far more advanced knowledge of the Hebrew and Greek Scriptures than appears in the theological manuals. Probably this would suggest a connection with the fountainhead of the religion which would give independence and authority outside the Church, and would further account for the violent nature of the Church's opposition.

In the course of the magical operation, conjurations (prayers) of increasing length and intensity are employed, the more powerful ones being employed in the event of the first not succeeding. Furthermore in the event of failure

[6] *Clavicula*, Book ii. cap. i.

or interruption the magus is told to recommence just as in modern hypnosigenesis repeated seances are employed until success comes.[7]

A vision seems eventually to have appeared to the hypnotized magus, or at any rate a conviction of the presence of unseen powers. Levi narrates an experience of this kind which seems credible. Possibly the usual hyperesthesia of comatose subjects and telepathy here assist to produce results which must have seemed supernatural.

Further points which indicate a quasi-hypnotic or hystero-epileptic state are as follows:

1. Repeated accounts of violent deaths of magicians (Cf. the legend of Faust) with epileptic symptoms.
2. The books generally say the process becomes easier by repetition and adepts need but little aid from ritual.

   ("So exact a preparation of days and hours is not necessary for those who are adepts in the art.")[8]
3. It is repeatedly affirmed that great danger accrues to those who neglect the precautions of fasting and due preparation. Personal purity, cleanliness and care in diet are strongly urged.[9]
4. Freedom from mental disturbance is essential.

   ["He who wisheth to apply himself to so great and difficult a science should have his mind free from all business and from all extraneous ideas of whatever nature they may be."][10]

Sufficient has, it would seem, been said, to indicate, if not the identity, at least the close analogy of religious cult, ceremonial magic, and auto-suggestion.

SOUTHSEA, ENGLAND. HERBERT CHATLEY.

[7] *Clavicula*, Book ii, cap. i, p. 74 in Mr. Mather's edition.
[8] *Clavicula*, Book ii, cap.i.
[9] *Ibid.*, Book ii, caps. iii, iv and v.
[10] *Ibid.*, Book ii, cap. iii.

"ID QUO MAJUS COGITARI NEQUIT."[1]

(A SCHOLASTIC ESSAY.)

THE main thesis of this essay may be stated as follows: The truth of the principle which absolute idealism[2] employs, in its polemic against Humism and Kantism, is not satisfied by the absolute idealist system—a system which judging it as I do from the standpoint of a scholastic I must characterize as pantheistic—but applied in a thoroughgoing manner it leads beyond idealism to a theistic metaphysic (which it shows to be the only possible metaphysic); with a scholastic logic, criteriology and epistemology.

There are two main lines along which the validity of the antithesis of thought and being may be defended, and it may seem that both defences fail in the end.

The first is the argument which starting from the ghostly and colorless nature of thought infers thought's inadequacy to the rich warmth of sensible reality. It has been stated as follows by Mr. F. H. Bradley in an often quoted passage (*Principles of Logic*, p. 533): "It may come from a failure in my metaphysics or from a weakness of the flesh which continues to blind me, but the notion that

[1] My title suggests St. Anselm's ontological proof. However, for me not God but Theistic Reality, which is indeed *reductively* identical with God, is "That than which a greater cannot be (or be conceived)."

[2] By which I mean Idealism of Hegelian descent such as is advocated by T. H. Green, Prof. B. Bosanquet, Mr. Haldane, Mr. J. B. Bailey, and Prof. J. M. E. McTaggart; with of course large individual variations. I should mention also Prof. A. S. Pringle-Pattison.

existence could be the same as understanding, strikes as cold and ghost-like as the dreariest materialism. That the glory of this world in the end is appearance, leaves the world more glorious, if we feel it is a show of some fuller splendor; but the sensuous curtain is a deception and a cheat if it hides some colorless movement of atoms, some spectral woof of abstractions, or unearthly ballet of bloodless categories."

Dr. Bosanquet (*Knowledge and Reality*, p. 19) after quoting this passage comments as follows: "The dream of the intellectual world as a land of shadows, now below and now above, now more obscure, and now more brilliant than reality; a dream which the unwisdom of ages has ascribed to Plato, seems never to lose its malificent spell."

The objection on which any such view as the one we are refuting must come to grief, is that which Aristotle insistently argues against Plato, namely that if sensibles are not intelligible then the ideas cannot help us to understand the sensible world.[3]

But in effect, the thought determinations of which the thought-system is the proper totality are not *cogitationes* (states of mind) but *cogitata* (intelligibles) and, since we can form ideas of sensibles, they are intelligibles, and will as such, take their proper places as differentiations of a thought-system.

The second line of defence of the validity of the antithesis of thought and being starts, not from their unlikeness, but from their unconnectedness.

To understand this we must place ourselves in the position of the idealist in controversy with his adversary the Humist. The philosophy of the latter[4] he finds to be determined throughout by a certain conception of the

[3] *Summa*, I, LXXXIV, Art. I, *sed contra*: "Si ergo intellectus non cognoscit corpora sequitur quod nulla scientia sit de corporibus et sic pirebit scientia naturalis."

[4] Cf. Green's Introduction to Hume's Treatise.

antithesis now in question; this conception he finds to be the very *fundamentum*—the governing presupposition of Humism.

Common sense forces on us all in one form or another the belief that reality is as a fact just what it is, and goes on just as it does, whether we know its nature and doings, or whether we are ignorant of them. Humism generalizes inaccurately this common belief and from "reality[5] is as it is independently of and prior to *our* thinking" passes to "independently of and prior to *all* thought."

At this point absolute idealism steps in and has no difficulty in showing that in so far as Humism is *any thing*, it is a theory and its world therefore an ideal construction constructed by, in the sense of being "nothing apart from," the categories of thought.

It is essential to the success of the argument of this essay that the reader shall have a lively apprehension of what is meant by speaking of things as the "work of thought."

Consider what is suggested to the mind by such words as "the universe," "the earth," "my wife," or "that piece of sugar."

The first named is plainly made what it is by ideal construction, that is by inference—the stars seem to be points of light, they are for us in virtue of ideal construction immense globes—the earth seems flat and immovable, but again by means of construction it enters for us into the universe as round and mobile.

But consider again "the stars seem to be points of light," "the earth seems immovable,"—have we here pure fact? Not at all. In the first place the possible discrepancy between seeming and reality is guarded against. The stars-points-of-light are known in concepts. What is a point apart from its systematic place in the concept space? Some-

[5] In this connection reality equals finite reality—"our world."

times it happens that when one repeats a word often its connotation, i. e., its setting of ideal qualification, falls off leaving one with the mere *flatus vocis*, but even this would be nothing if it were not still ideally qualified as a "sound"; as such and such a sound of recognizable quiddity.

In the same way we could show that "my wife," "this piece of sugar" and, even the content of the ejaculations "red hot!" "horrible!" are each ideal constructions.

Prof. B. Bosanquet and Dr. Whewell bring this out excellently in their several ways.

"If a sensation or elementary perception is in consciousness (and if not we have nothing to do with it in logic) it already bears the form of thinking. I will not say that it is a rudimentary judgment; but it is certainly an act, for it is a charge within a percipient subject; it has identity in itself or it could be nothing for consciousness, and difference, or it could not have identity; and it stands out against the other elements of the momentary consciousness in a way that approaches to an attribution." (Bosanquet, *Logic*, Vol. 1, p. 33.)

"When we speak as if we saw impulse and attraction, things and classes, we really see only objects of various forms and colors, more or less numerous variously combined. But do we really perceive so much as this? When we see the form, the size, the number, the motion of objects, are these really mere impressions on our senses, unmodified by any contribution or operation of the mind itself? A very little attention will suffice to convince us that this is not the case. . . . A certain activity of the mind is involved not only in seeing objects erroneously but in seeing them at all. With regard to solid objects this is generally acknowledged. . . . But we may go further. Is plane figure really a mere sensation? . . . . All objects are seen in space; all objects are seen as one or many: but is not the idea of space requisite in order that we may thus ap-

prehend what we see?....Thus the difficulty which we have been illustrating of distinguishing facts from inferences and from interpretations of facts, is not only great but amounts to an impossibility....We cannot obtain a sure basis of facts by refecting all inferences and judgments of our own, for such inferences and judgments form an unavoidable element in all facts. We cannot exclude our ideas from our perceptions, for our perceptions involve our ideas. (Whewell, *Novum Organum Renovatum,* p. 52. Compare also p. 116.)

Once we learn to see in the instance of large and elaborate contents like "the universe," or by the study of a persevering and detailed criticism (such as Green's) of Humism, that in every fact there is embedded a theory and that the fact only is a fact because of its theory; we shall see also that it is idle to look anywhere within theory for minute data which are internally free from ideal construction, and which only enter into theory as units externally connected by it.

Each of such units is itself the content of a theory—the nature of mind is, as Professor Bosanquet says, present in it and makes it what it is.

As the repeated division and subdivision of matter brings us no nearer to getting rid of its extension, so the repeated extraction and re-extraction of factual elements from a theoretical network has no tendency to get us down to pure unmediated datum.

And as it is futile to attempt to escape from ideal construction by way of minification, so also is it equally futile to attempt to escape by way of magnification. As whatever is material is extended, and remains extended while it remains material, so also whatever in any sense is, is theoretical and remains theoretical so long as it in any sense is or is not.

All reality is of necessity primarily the content of a

theory: everything namable is what it is in virtue of its theoretically determined systematic place, in the ideal totality: *Thus if we can get to understand what the structure of the true theoretic whole "id quo majus cogitari nequit" is such of necessity is the structure of real reality.* It is mere failure to *see* to speculate about a real order of things possibly conformed to, and possibly discrepant from, the order of thought. In the reality of things *is* their ideal or theoretic nature. There is not one problem as to the nature of the ideal order and another as to the disposition of real existence; they are the same problem.

What we most commonly mean by the real is, that which is continuous with the world disclosed to us through sense experience and thus we are led to speak of this real world as extended by means of ideas as if *it* were the primary real and the ideal structure the secondary real supported by the given sensible. This is an illusion, for in the first place the supposed nucleus of given fact which is to support the ideal extension is a fiction: in the second place the flow of reality is the other way. It is not the ideas which are real *qua* continuous with sensible fact, but the sensible fact is real *because, it is ideal,* i. e., in virtue of its participation in the ideal totality.[6]

Take up *anything* merely as object of thought or ignorance or bewilderment or what you like. It is a something identical with its self. What is it? Here is a question of its nature answerable, and also of its nature answerable in one way only: that is, by exhibiting the content in question harmonized in its systematic place in the intelligible totality. The content as something is of necessity in ideal relation with every other something, as having with each something or nothing in common, being to each greater or less, prior or posterior, like or unlike, comparable or

[6] This point—one of great importance to my argument—is admirably argued in Mr. H. H. Joachim's essay *On the Nature of Truth,* pp. 80-82.

incomparable.[7] By the nature of the case implication cannot be satisfied unless all intelligibles form a closed system and equally by the nature of the case implication cannot be denied satisfaction—for its law is the absolute prius; one might say of it in relation to philosophical agnostics who modestly doubt "whether our faculties are able to inform us as to the ultimate nature of the real,"—"When me they fly, I am the wings." As easily escape from space by moving out of it as doubt, think, or in any way be, or not be, outside the ideal totality which is of its nature all inclusive.[8]

It is not necessary to have separately contemplated every possible individual triangle in order to be in a position to say that every one of them must be either equilateral, isosceles, or scalene; it is not necessary to have contemplated separately every individual possible being in order to know that it must have the systematic place and the properties which belong to it as being.

It is often said that so long as we are ignorant of anything we cannot possibly *perfectly* understand anything else; the converse of this is true, viz., that if to any degree we know anything we cannot be *perfectly* ignorant of anything else.

All reality is, to an extent, pledged and defined in every judgment. Blank ignorance as to the nature of things is in the strictest sense impossible in spite of the agnostic's affectation of it. Once true always true. If we know that A is A—if this is *true,* then our ignorance of all the rest of reality is limited; for we know that come what may

[7] Mr. Bradley (*Appearance and Reality*, 2d ed., p. 580 footnote) points out that something in the way of qualification must result from any comparison.

[8] Ignorance falls within knowledge. We can only be ignorant of a basis of knowledge. It is only by possession of an outline map of a continent that we can know that there are points of the interior unexplored. Ferrier (*Institutes of Metaphysics*, sec. 2.) St. Thomas, *Summa Contra Gentiles*, Lib. II, cap. XCVII "Est enim proprium objectum intellectus ens intelligibile, quod quidem comprehendit omnes differentias et species entis possibilis, *quid quid enim esse potest intelligi potest.*"

it must at least be of-such-a-nature-as-to-consist-with-the-maintenance-by A-of-its-A-hood. God himself,—let us not fear emphasis in a good cause—God himself, I say, having made A to be A has no longer quite a free hand anywhere in the whole range of reality as to what He shall make anything else to be for those predicates at least which determine its relation to A are predetermined for Him or for it.

In logic once you admit anything you are already committed to all that is logically implied in your admission; this is a consequence of the all-inclusive nature of the intelligible as it appears in a process.

No view could be more false in logic, than that view which regards premises as detached truths, which in reasoning enter into a merely external relation with each other, and with the mind, so that the mind takes them up when it will, uses them as it will, and drops them to lie inert once more when its purpose is served.

On the contrary, having started a question the mind is powerless to do anything else than see it through to the end. Until the conclusion is produced the premises are endangered. Action and reaction are as between premises and conclusion equal and opposite. The premises constrain the conclusion; if the premises are true the conclusion follows, if the conclusion does not follow the premises are not true. Until the conclusion has followed the premises are on trial for their life and the reasoning mind which by accepting them has identified itself with them is on trial for its sanity; that is, for its existence as reasoning mind.

Instead of considering the premises as inert and the mind as employing them as instruments, let us rather consider them as like elemental forces which the mind may indeed evoke into activity but which having evoked it is

as powerless to control as it is to control the unending procession of summer and winter, seed time and harvest.[9]

The Hegelian dialectic is a very good example of this. It is in intention an attempt to interpret the stages of the automatic recovery of content from a state of abstraction. It is a perfectly impersonal instrument and the mind while submitted to it is as powerless to arrest the procession of the categories as a man falling through the void would be powerless to arrest his fall by wishing to do so.

If anything is it is, if it is it is A; if it is A it is AB; if it is AB it is ABC; and so on, so that unless ABC....Z *were*: nothing would be and if anything *is* ABC....Z *is*.

* * *

If, as we have just seen, the process from ignorance to knowledge is a process of recovery by content of the implication from which in the beginning it is taken as abstracted, it will follow at once that a content approximates to the supreme intelligible exactly in proportion to the richness of its realized implication. A being has more unity, is more to and for itself, in proportion as external relation enters less into its essence.

Now the root in a being of external relation is composition, because the constituents of a composite *in quantum hujus modi*, are not-each-other, and therefore the composite is a meeting place of differents, and partially belongs to each of divers orders, so that as belonging to one it is in external relation to the other.

Now because whatever is, is (or has) being, and is therefore, in relation to all else that is or has being, (i. e., to every possible mode or manifestation of being) there is no possibility of escape from external relation by stripping the thing of qualities to such a degree that it escapes

[9] A scholastic definition I remember seeing quoted in T. H. de Regnons's *Metaphysique des causes*, brings this out well: "Ratio est vis animae faciens currere causam in causatum."

from external relation for sheer lack of qualities to serve as points of attachment—rather by this process we tend to leave it no being but that of external relations. (Kleutgen, Vol. III, p.123, No. 593—see the quotation from Maurus.)

The whole nature of reality qualifies every reality and the sole question is as to whether it qualifies it internally, that is by being possessed as an attribute, or by way of external relation.

Though its suggestion of numerical form is exceptionable we need not seriously quarrel with Spinoza's "Quo plus realitatis aut esse unaquaeque res habet, eo plura attributa ipsi competunt." (*Ethics,* Prop. IX.) But the scholastic formula is preferable: "Quaecumque ens in quantum ens est unum et verum et bonum."[10]

Now an order implies a principle (*ubi est ordo ibi est principium*); an order of beings measured in degree of being according to degree of self-sufficiency implies a principle which absolutely is and is in all relations absolutely *a se.*

To doubt this, or to doubt the necessary subsistence of this principle is only possible under the domination of the common sense illusion as to the relation of ideal and real. *If the ideal order is exigent of such a principle where*

[10] The doctrine of degrees is almost with the scholastics the master key of reality and they delight in running up and down the scale in various ingenious ways (see for example Dissertations VI and VII of Kleutgen's great work on the Scholastic Philosophy). Another modern scholastic of great acuteness puts the matter thus: "Now this light of knowableness in things is more or less self-manifesting to the reason, in proportion as the things themselves are high in the order of self-sufficiency in their own nature. And this rule qualifying as it does the highest in rank of Being for the worthiest in the rank of object of science, yields as the due order of dignity for science the same as that which is assigned above. In which *the divine self-sufficient principle of principles* stands first in its luminous simplicity (*Lord Bacon's Philosophy Examined,* Rev. F. H. Laing D.D., p. 94). I may conclude by an example from St. Thomas, *Summa Contra Gentiles,* Lib. II, cap. XCVIII, "Quanto autem aliqua substantia separata (*pure spirit*) est superior, tanto ejus naturae est divinae naturae similior, et ideo minus contracta, ut pote propinquius accedens ad ens universale perfectum et bonum. (Compare App. and Reality, Chap. XXIV.) One might also venture to discern a poor relation of this law in Mr. Spencer's "Formula of Evolution."

is there a higher law to say it nay? And what can be more real than that which is most real in that ideal order whence reality flows to the sensible?

We must now proceed to apply this law of the intelligible order, viz., that the more self-sufficient, the more one, the more intelligible is the more real and the prior reality to the interpretation of the content of reality.

Prop. (1) God is the Ens universale.

Truth is predicated primarily of judgments, secondarily of their correlative concepts,[11] thirdly of the entities in which these concepts are realized.

According then as a being is the more nearly *a se*[12]—the more real—the judgment expressing its essence will express more reality[13]—will be a more universal truth. The "I am" of God expresses all reality and God is therefore called the Universal Being.

Prop. (2) God is self-conscious and omniscient.

The process of which God is the culmination is a process of unification. One aspect of this is the unification of subject and object;[14] this union is perfect, therefore God knows Himself perfectly. To do this He must know in what He is, what He is not. What He is not is finitude, and as every determination of finitude is a different "not God" it follows that in God's perfect self-knowledge He knows as in a mirror every possible determination of finitude down to the uttermost detail.

[11] For relation between judgment and concept see Welton's *Manual of Logic*, Vol. I, pp. 13-16, and Harper's *Metaphysics of the School*, Vol. I, pp. 448-9, Note 3.

[12] i. e., here and always—the more near in the scale of being to the *Ens a se*.

[13] Aveling's *God of Philosophy* (Sands & Co.), p. 113: "As we ascend the scale of being, we find more and more included in our judgment of the nature of the subject."

[14] St. Thomas, *S.C.G.*, Lib. I, caps. XLIV-LXXI.

Two other proofs that God knows may be just mentioned.

(*a*) It is involved in the notion of truth that it is eternally true; but truth is in mind, therefore there is an eternal mind.[15]

(*b*) "If anything ever began to be, something at least must have existed and this eternally. Now this eternal being must be intelligent; otherwise its relations could only be to already existing things. It could have no relation to the purely possible. And therefore the non-existing would never have begun to be[16]. . . . since it is only by the translation of a pre-existent intellectual idea into actuality that non-being can be made to give place to being."

Prop. (3) God is not-the-world.

This formulation is clumsy I know. The proof is as follows: God is utterly one (*maxime unum*) but if He was in any way or in any relation whatever one with the world He would be subject of and subject to its distractions.

It is, we may say, in relation to our intellectual need of the very essence of God, that He shall be not-the-world. So far as He is in any way one with the world, so far He is distracted with its distraction, which it is *for us* His essay to heal. Leave any degree of oneness between God and the world and to that degree you have still not reached your goal. God could not be what He is to the world and do what He does for the world unless (*a*) He was everything to it and (*b*) it nothing to Him—nothing that is in the way of contrast or external relation.

Pantheism says that God must be in some way one with the world in order to be anything to it. Theism replies that God *cannot be* one with the world or else He could not be to it *that which* He is, i. e., its Absolute.

[15] St. Thomas, *Summa*, I, XVI, Art. 7: "Si nullus intellectus esset aeternus, nulla veritas esset aeterna."

[16] Aveling, *op. cit.*, p. 49, footnote.

Prop. (4) The Divine Life is simple, eternal, pure act and not subject to process.

The doctrine of the last proposition must be rigorously carried out. If God was in any way (*qua* substance) concerned in the processes of reality; if there was in Him any becoming; if creation was necessary to Him, or was an unfolding or enrichment of His life or consciousness; if there was in Him any progress in knowledge, any composition, any variableness, or shadow of turning; if anything can be affirmed univocally of Him and of creatures: then so far He would be not-God, not the Absolute, would have no systematic function, and would be "no use" to the speculative mind or to the religious soul.

I repeat that God is not *in genere*; that He is in no real relation to creatures but is *a se* yesterday, to-day and forever, that nothing is the same in God and in creatures, these are all ways of expressing the same truth. and that truth one which if we would save our souls and our reasons *we* must hold without variableness or shadow of turning.

* * *

So far we have joined forces with the idealist and have, we hope, in his company finally demolished the Humist phenomenalist. So far, or at least up to the beginning of the second proposition, we have been able to make use of the idealist phraseology in all sincerity except that possibly we slipped into saying once or twice that reality is nothing *but* a system of thought determinations, when we should have stuck to the expression "nothing *apart from.*"

Prop. (5) Reality as a system of thought-determinations is still charged with unsatisfied implication and is therefore logcially exigent of further determination. In other words, a thought-system is a system of universals and a universal as such is undeter-

mined; that is, stripped of its final individuating determinations.

(a) A system of thought determination is at once a construction from, and a process of determination of, its datum. The construction rests on and depends on the datum, and at the same time it reacts on and modifies the datum. The datum antecedently to its determination in the process is an α which is *in potentia* to the further determination β, γ and δ. Therefore it is a universal α: therefore the β and γ which rest on and are determined by α are all universal β, γ and δ. In reality, as we have repeatedly urged, implication must be satisfied; in a system of universals implication cannot be satisfied; therefore reality cannot be a system of universals.[17] As easily build up a circle out of straight lines as construct a system of satisfied implication out of universals.

(*b*) We may arrive at the same conclusion by a somewhat different path:

We have insisted (pp. 521-2) that determination as between premises and conclusion is reciprocal: therefore a thought is in a state of logical stress as necessarily containing undischarged implication. Its individuals, as the scholastics well knew and insisted, are individual *types*,[18] still *in potentia* to final individuating determinations. Upon this is founded the well-known distinction between the *scientia simplicis intelligentiae* or God's eternal knowledge of all possibilities considered as respects *ad extra* of His essence and the *scientia visionis* or divine eternal vision of things as actually existent.[19]

[17] I may take this opportunity of giving a general reference to my paper in *Mind*, N. S., No. 61—"The Structure of Reality"—which covers very much the same ground as this present paper and in which the point we are now arguing is specially insisted on.

[18] Ricaby, *God and His Creatures*, p. 36, footnote. Also Harper, Vol. I, p. 338 (Prop. LXIII)—particularly the quotation from St. Thomas on p. 340.

[19] St. Thomas, *De Veritute*, III, 5 ad 2: "Scientia visionis addit supra simplicem notitiam aliquid quod est extra genus notitiae scilicet existentiam rerum."

(c) Finally we may lay Mr. Bradley[20] under contribution for an argument (which, being at the moment out of reach of his books, I paraphrase loosely from memory): "You can think of what you like for there is nothing of which you cannot make an idea. In this sense everything must be called intelligible. You can think of thisness, you can abstract the feature of presentation but each time your thought refers to a subject which it does not exhaust. The idea is to an extent necessarily loose from the existent; it can never succeed in being the idea of this existent only. Your thisness is still a *universal* thisness." Never can the idea of an object be that object. It is always and of necessity just not the object. It is as not the fact, that the idea unifies or colligates (in Dr. Whewell's word) the facts. In a sense one can accept T. H. Green's criticism that for the maintainers of the validity of the antithesis of thought and being the sole and simple determination of Being is that it is not thought. *Being is realized idea,* i. e., idea existing in an un-ideal state. There is between thought and being a point for point correspondence in a medium of "otherness."

If we consider now the system of thought-determinations, we may see that it is related on the one hand as a system of possible finite beings to the system of actual finite beings, and on the other hand it is related as a system of ideas to the divine intelligence which is both the knower of these ideas and the primary object in which, as a mirror, they are known. There is therefore—we are standing at the divine viewpoint and looking outwards to finitude—a being (the divine) which is prior to the divine thought and which is its support and foundation, and a being (finite being) which is posterior to the divine thought and is its term. The system of thought is a system of typical

[20] I find on referring that what I have done is to compound App., cap. XV, with *Principles of Logic* in a very bad imitation of the Bradleyan manner.

possibilities of imitation *ad extra* of the divine essence (which in this system is the logical *prius*) and is objected to the *scientia simplicis intelligentiae*.

But the universal implies the concrete and concrete essence is *ens actu* (existent being); as then the possible is referred to the divine essence *qua* intelligence the concrete is referred to it *qua ens actu*.

In the order of simple intelligence God *qua* first intelligible is the foundation and logical *prius*, therefore the relation of priority being preserved and transferred to the order of being we have to say that in the order of being God has absolute entitive priority—is first cause.[21]

The order is: (1) God; (2) the order of finite intelligibles which are respects *ad extra* of the divine essence actualized by the divine intelligence;[22] the order of finite actuals which are imitations *ad extra* in the medium of finitude of the divine essence and which are actualized by the divine will.[23]

As God is the total final efficient and formal cause of existent finitude, which as a whole and as referred to God has no material cause, we express this by saying that God created the world out of—nothing.[24]

[21] i. e., first in order of nature and then consequentially first (if so be) in order of time. Just as when an assembly breaks up the person first in rank leaves the room first. Even Professor Bosanquet seems to think that the eventual priority claimed for the first cause is priority in temporal relation.

[22] A very able scholastic, Canon Walker, whose masterly monograph on *First Principles* has only just become known to me, writes (p. 14 of that essay) as follows: Libertore seems correct in saying that it is the intellect of God which takes them [the ideas] out of their fundamental state in His essence and gives them an actuality.... The essence of God is therefore the remote cause, His intellect the proximate cause of these ideas. Harper's *Metaphysics of the School* (Vol. I, Chap. II) gives the same teaching.

[23] Spinoza (*Ethics*, Part II, Props. VIII and IX) clearly recognizes the necessity for a difference between the way in which mere possibilities are referred to God and the way in which existent finites are referred to Him.
Compare Kleutgen, Vol. III, p. 28 (Nos. 555 and 556).

[24] Ricaby, *op. cit.*, p. 104; St. Thomas, S. C. G., Lib. II, cap. XXXVII.
Compare also Prop. 4 which shows that there can be no kind of emanation of the divine essence; also the paper in *Mind* previously referred to where I urge that the realization by an intelligence of its idea *is* will. This is Mr. Bradley's teaching but I think it is also St. Thomas's. The latter says (*Summa*,

We have next to show that God is genuinely free in respect to creating or abstaining from creating. I offer the following argument.

God as foundation of, is prior to the whole ideal order: therefore all possibilities absolutely presuppose His existence, therefore He cannot not exist — there can be *no* circumstances to which His prior existence is not necessary: Therefore His existence is an absolute necessity— that is to say He exists by His essence just as a trilateral figure is triangular by its essence.

Finites on the other hand though in the ideal order they are as referred to God necessary, eternal, and immutable, do not exist in this order but only as referred beyond it by the divine will. They are therefore essentially indifferent and passive in existence and non-existence. The ideal order known in the *scientia simplicis intelligentiae* which is the foundation of all necessity, is entirely blind to their determination in respect of existence which is objected to the *scientia visionis.* Existence is to them a purely extrinsic and conferred super-determination. They are brought into and maintained in existence by the power of God, which, being withdrawn, they would at once collapse into their native state of possibilities. As well expect a rope to stand upright on its end as make finites exist by their own essences.[25]

From this it follows that creation and non-creation are genuine alternative possibilities: both (like everything else) founded in God; therefore both possible *for Him.* Now God exists *sub specie aeternitatis* and therefore for Him antecedent possibility is not limited by the "subsequent" fact of creation. It is therefore an illusion when we think of God as antecedently free in respect to creation

I, XXIII, Art. 1): "Ratio autem alicujus fiendi in mente actoris existens est quaedam prae ententia rei fiendae in eo."

[25] *God and His Creatures* (p. 236).

or non-creation to add the thought that nevertheless it must *in fact* be already fixed that He is going to do one thing or the other.[26]

Consider what play[27] is to man. It is an activity pleasurable in itself and of which the essence is that it shall have no efficient cause (e. g., need of exercise) beyond its pleasurableness, and no final cause (e. g., to win a prize) beyond its pleasurableness. It is of the essence of play that it shall be a perfectly free activity.

I think we get the best idea of God's freedom in respect of creation by thinking of it as the Divine play.[28]

We should therefore conceive God, the *ens universale, perfectum et bonum*, as resting eternally *a se*, perfectly complacent in His seamless simplicity, pure life, pure truth, pure act;—ineffable, immense, and yet "He compasses thee round and bears thee in His arms; He takes thee up and sets thee down.[29]

We have now reached a general view of the structure of reality: (1) God, the center or axis; (2) finite possibles, the inner ring; (3) the creation, the periphery.* But the scholastic philosophy teaches that after having ascended from consideration of creatures to such knowledge of God as is possible for us, it is useful to descend again to reconsider creatures and their activities in the light of that knowledge of the whole order of reality to which we have now attained.[30]

Our first attempts shall be to throw light on some ob-

[26] St. Thomas, S. C. G., Lib. I, cap. LXVII, *Rursus.*

[27] Mr. Bradley, "On Floating Ideas and the Imaginary" in *Mind*, N. S., 60.

[28] There need be no irreverence in this conception. Play is not necessarily trivial. Macaulay, I think, speaks of Milton's sonnets as a sort of play of the poet's mind.

[29] Newman's *Parochial Sermons*, No. IX, p. 136.

* These spatial metaphors are of course *merely* metaphors.

[30] St. Thomas, *Summa*, I, LXXIX, Art. 9: "Nam secundam viam inventionis, per res temporales in cognitionem divinimus aeternorum secundum illud apostoli ad Rom. i. 20, '*Invisibilia Dei per ea quae facta sunt intellecta conspiciuntur.*' In via vero judicii, per aeterna jam cognita de temporalibus judicamus, et secundum rationes aeternorum temporalia disponimus."

scure features of the scholastic teaching in logic and epistemology, viz., as regards self-evident principles, the distinction between the formal laws of thought and the matter subsumed under them, the correspondence theory of truth, perception by species and the maxim *nihil est in intellectu* etc.

Take a series of beings such as the following—a lump of clay, a piece of living rock, a single atom, an amœba, a worm, a lion, an angel, God.

The first approximates to the formlessness of *materia prima,*[31] the second has a unity of natural cohesion and an ordered crystalline structure, the next (the atom) has a true substantial form but since one atom is much like another it is relatively speaking abstract and un-individual, in the next (the amœba) the form is sufficiently active to impose itself on strange matter (nutriment); the next (the worm) has a higher grade of life but still it can survive division and therefore its unity cannot be much to it; of the next (the lion) this is not true but its form (always the principle of unity) is immersed in matter to such an extent as to be inseparable from it. Here I may interpose that as radical extension is of the essence of matter the form of a material organism must have, relatively speaking, a low grade of unity.[32]

We now come to man, and we notice that while on the one side, the remark made just above applies, on the other side the human soul has an immaterial operation so that it is midway between the soul of a brute and a pure spirit. It is like the latter in not being dependent for its being on union with the body but it approaches the former in being naturally exigent of such union.

As there is the grand scale of beings stretching upwards

[31] "Materia Prima quae est omnium maxime divisibilis, ac minime una, cum facta quaecumque divisione conservetur, est imperfectissimum ens et minime unum." Quoted in Kleutgen, III, p. 355.

[32] Kleutgen (III, pages 354-355 no. 704) works this out most beautifully. All my quotations from Kleutgen are perforce from the French translation.

from *materia prima* (*prope nihil*) at the nadir to God—pure act—at the zenith; so there are within this scale subordinate series, repeating its gradations on a smaller scale. Such a subordinate scale, that of immaterial forms, begins at the soul of man which occupies in it a position corresponding to that which *materia prima* occupies in the main scale.

The characteristic operation of immaterial forms is knowing[33] and as *operatio sequitur esse*—man's knowing within the series of "knowledges" has the lowest possible grade of *a se*ity; consequently it is dependent on bodily organs (the organs of sense) its proper object is the intelligible in the *material*. It is actuated by species from *without*. The truth which it knows is as it were *divided*, and is different from the undivided truth of God; it begins as it were abruptly from a group of first principles,[34] and as a consequence its knowledge is always rather an *aggregate* than a true unity,[35] and because of the beginning it is dependent *ad extra* and subsumptive in form, that is, we know rather by *means of* than *in* first principles.

We are thus able to convert a difficulty into an instance and to understand *why* we are incapable of apprehending the truth in a perfectly satisfying form. The scholastics

[33] St. Thomas, S. C. G., Lib. I, cap. XLIV: "Ex hoc aliqua res est intelligens quod est sine materia."

[34] The best account of the nature of the self-evident first principles known to me is to be found on p. 44 (Objection VI) of Dr. Laing's book already referred to. On the whole subject in its broadest sense Canon Walker's monograph (*First Principles*) is a most finished specimen of scholasticism at its best.

[35] M. Mahers, in his *Psychology*, p. 302, quotes Coconnier, *L'âme humaine*: "Examinez les idées que vous faites des differents êtres, et vous verrez, que vous les avez toutes constituées à l'aide des notions transcendentales et *communes* de l'ontologie. Notions d'être, de substance, de cause d'action, d'espace. D'aprês cela nos idées des choses materiels sont commes autant de faiseux de concepts." According to the scholastic view (which if not without difficulties is at least a beautiful bit of speculation) our knowledge stands to the divine (and in a less degree to the angelic) knowledge as does the broken image seen through the facetted eye of insects to the perfect image seen through the human eye. Each facet would represent a first principle or "fundamental idea."

were familiar with the predication puzzle, so dear to Mr. Bradley.[36]

Our second attempt is to be of a more ambitious nature —indeed it is one for the conception of which I make a modest claim to some degree of originality. So far as I know the attempt has not previously been made to formulate a theory of theory which will enable us to judge of the finality of any particular theory by a consideration of its theoretic form.

It will be plain that the principles we have laid down as to the gradation of entities in the order of *a se*ity do not depend for their validity on the real existence of the entities subjected to gradation, any more than the principles of geometry depend for their truth on the real existence of triangles, squares, circles, etc.

Now Hume, Kant, Hegel,[37] and St. Thomas each offer us a certain conception of the universe, and for each of them his conception of the universe *is* his universe. I propose therefore to attempt to place their universes in systematic order according to the principle of *a se*ity. In this order that which is supreme will be (as referred to God) *"id quo majus cogitari nequit"*— will be a true system of satisfied implication and will therefore be ultimate or real reality. The others will be; each in proportion to its distance from *a se*ity; in a state of logical stress or undischarged implication and they will therefore be subordinate worlds just like those of fiction.[38]

To begin with Hume: He conceives thought-processes (as does Locke) as the functional activities of a thinking thing under stimulation, and therefore as subjective pro-

[36] Kleutgen, Vol. III, pp. 17-18 (nos. 546 and 547).

[37] Hegel=short for absolute Idealism. My information is acquired from the authors referred to at the beginning of this paper and from stray papers in *Mind*, and translations into English and French. It may seem temarious to undertake this discussion under such conditions, but I hope this is just one of the cases where "the commonest facts are the most important."

[38] I believe it is Dr. Bosanquet's merit to have first made prominent the metaphysical significance of imaginary worlds.

cesses, connected indeed with the unknowable outer world as effects of changes in it and as indirectly causes of further changes but not in their structure concatenation and inner nature significant of its structure concatenation and inner nature which if accessible at all to our knowledge are so only when investigated by means of observation and experiment.

We said earlier in this paper that if phenomenalism is not a theory neither it nor its world is anything.[39] A theory is a presentation of a multiplicity *per modum unius* and the unity, such as it is, in Humism is to be found in time and space. Now this is a unity of the lowest possible grade for (*a*) both time and space are extended and have parts outside parts (*b*) the unities in phenomenalism like the light in Milton's Hell "serve only to make darkness visible"; that is to say, they do not explain the facts but barely render intellectual contemplation of them possible. These unities supply as it were a form to the matter (the momentary and isolated sensations) of experience, but it is a form accidental to the matter and to the least degree one with it. The matter lies on the form like stones on ice.

The low logical state of phenomenalism may also be seen in another way. It is a kind of picture thinking. Now according as we progress in knowledge to that degree are we free from dependence on phantasm, figures, working models and in the same measure again to the truths we possess we approach to a genuine incorporation with the understanding and become invested with a true necessity and universality. The modality proper to phenomenalism is that of opinion ("it may be"). The truths of phenomenalism are immersed in accidental circumstances of time and space.

[39] Bradley, App. p. 122 (*Phenomenalism*): "The theory seems a unity which if it were true would be impossible."

Kant's work was to show that the categories of thought are (as pre-requisite to the possibility of experience) logically prior to that experience in which observation and experiment are possible. So that whatever presupposes general experience (e. g., detailed scientific results) presupposes also what general experience presupposes, viz., the categories of thought.

In Kantism the matter and form of experience, which in Humist phenomenalism are merely in external contact, begin to *blend*. The categories of thought are recognized as contributory constitutives of the known reality and in the modality a genuine though subjective necessity begins to emerge.

Nevertheless the unity is of low grade because the form is recognized as alien to and as *imposed* on the matter. We are forbidden to distract our attention, and our theory, by watching for the thing-in-itself, but nevertheless it is made impossible for us not to do so. The Kantian known reality is distracted on the one side by reference to the purely mental world of thought-forms and on the other side by reference to the extra-mental world of noumena.

Kant's matter of experience is itself what, to adapt a scholastic phrase, we may call "*materia signata*"— assigned matter, *in potentia* not to any order but only to that of thought; and further not assigned to this order as a whole but as exigent of a certain manner and order of imposition of the categories, so that, e. g., a certain portion must be conceived under the category of causality and a certain other portion under that of substantiality.

From this it follows that Kant's raw matter of experience—that one of the constituents of experience which should be free from ideality—is just as much "the work of thought" before as after its union with the forms. It results that the determination of form upon matter is a determination of thought-system by thought-system. The

distinction of matter and form is in fact a distinction within thought.

Kant's then is a system transitional between Humism and Hegelianism—the ghost of Locke's outer world still haunts it.

With regard to Hegelianism I have little more to say as I have already discharged at considerable length (Prop. 5) my main criticism.

And (if I were sufficiently vain to use language which Mr. Bradley may use without vanity) I should add that for those who understand, this objection makes an end of idealism.

In Kantism the thought-system is distracted by external relation inasmuch as it implies in a medium of universality and in that system is denied *all* the content of reality which content is in the order of being repeated in a medium of concreteness. In Hegelianism the thought system has all the content it desires *and more,* namely, it has all the content of the order of being as well as its own.

Now just as it is not a limitation of freedom of movement to be unable to move out of space, nor a derogation from God's omnipotence to be unable to do that which is intrinsically impossible and which therefore is no term of action, (any more than beyond space is a term of movement); nor a derogation from His infinitude that He is not finite; nor a derogation from the Absoluteness that He stand to the relative in relation of irrelativity; so also it is not a derogation from but rather a part of the completeness of the thought system that it is not-the-Being-system.

The Hegelian attempt therefore to surcharge the thought-system with content has actually the effect of impoverishing it. Perhaps I shall be appealing to the non-Hegelian side of Mr. Bradley's thought but still I cannot

forbear to enforce this criticism by remarking how obviously in "Appearance and Reality" the perception of the non-identity of thought and being combined with the Hegelian assumption that the absolute is the inclusive whole has led to a tendency to conceive the absolute as a Schellingian *neutrum*. An idea and its object are opposed precisely as A and not-A. Identify the finite object "not-A" with the absolute and you therefore identify it with that with which the absolute is identical, namely A, the divine idea. Then as referred to the same point, A and not-A cancel one another and we get the neutrum.[40] The following arguments may assist to show that Hegelian idealism is not the ultimate but only the pan-ultimate philosophical system.

(1) The determination of the whole system follows that of the absolute—but in Hegelianism the seat of absoluteness is undetermined and undeterminable.

For we cannot say that the system as a whole is the absolute, nor can we say it of the systematic center.

(*a*) Not of the system as a whole, for that contains the multiplicity which it is the function of the absolute to unify.

(*b*) Not of the systematic center, for as so conceived the multiplicity is as necessary to it as it to the multiplicity. Thus the systematic center is determined by relation to the multiplicity: it is nothing apart from the multiplicity, which therefore is equally with it necessary and eternal. Therefore it is not the absolute.

The process of knowledge is a process of unification. The absolute is the realization of knowledge, but if its unity is in contrast to a multiplicity it is not perfectly realized in itself but is in itself in a measure potential.

To put it briefly: just as we saw that the absolute must be self-conscious because it is eternally necessary and of

[40] This point is enlarged upon in my paper in *Mind* already referred to.

itself intelligible in act and must therefore be the subject of its intelligibility, so also must it be in itself the completely adequate object of its knowledge; and this it would not be if its thought had to consider anything beside itself in order to understand itself.

(2) Pantheism bears all the marks of a penultimate system, one, as it were, still in the womb of reason, its features still undifferentiated. As its absolute is not *quite* the absolute so its finitude is not *quite* finite but in it finite and infinite are mixed together and still awaiting the final touch of purifying distinction. The best it can manage in the way of finite individuals are only make believe individuals, their minds play at being, but they cannot be really distinct from the absolute mind; in them it is God who pretends to be ignorant of His own thought, their truth is not really truth and their error lacks just the distinguishing peculiarity of error.[41] *Theism alone can do justice both to the finite and to the infinite.*

(3) In the theistic reality being is the limit of thought just as a circle is the limit of the inscribed polygon—every enlargement of the thought-system carries it towards this unattainable limit. Truth is the correspondence of thought and being. Now a more enlarged thought-system is more near the being-system than a less enlarged, just as an inscribed figure of a million sides is nearer to the circle than an inscribed triangle. To consider a truth as cohering with other truths is to consider it in an enlarged system of relation—an enlarged thought-system; and a more enlarged thought-system stands to a less enlarged as proximately representative of the being-system. We have therefore an explanation of the relation of the cohe-

[41] Mr. Joachim's essay on *The Nature of Truth* (chap. IV, Monism) which has been much before my mind while writing this. It was from Mr. Joachim's essay that I gained the conception of pantheism as the penultimate system. It, with its coherence theory of truth, "suffers shipwreck at the entrance of the harbor."

rence and correspondence theories of truth and error, which is at the same time a reconciliation of them. Coherence is a test, in a certain sense the *test* of truth. Correspondence of thought and being is the *definition* of truth.

To understand in what consist finite truth and error: We may conceive God as contemplating among creatables finite minds which He will further conceive as endowable with the capacity for becoming the centers of subordinate thought-systems and being-systems (my conception of the world—my world). These subordinate systems will fall into their places in final reality either as systematically homologous and as concentric with but minified from the final system and as reproducing it on a lower apperceptive level, (and in this case the systems are true and their truth though finite is impersonal, and their objects are identical each for each with the corresponding objects known to God). Or else these subordinate systems will be systematically unhomologous and eccentric and needing an epi-cyclic connection to bring them into their places in final reality. In this case the systems will be false and their worlds will be worlds of fiction.[42]

The system of reality as conceived in theistic metaphysics alone as contrasted with any other, is capable of infinite enlargement without displacement of its systematic center. Every enlargement only changes it in the direction of making it more itself. Every system that can be set up against it falls obediently into its place as a subordinate system, and so illustrates the truth it pretends to deny. To conclude: Theistic reality is not merely as an empirical but as a necessary truth *"id quo majus cogitari nequit."* Therefore it is the real and ultimate reality.

GERALD CATOR.

LONDON, ENGLAND.

[42] Compare Spinoza, *Ethics*, II, Prop. XI. Coroll.

[illegible] intelligible [illegible] and must therefore be the subject [illegible] intelligence; so also must it be in itself the com- [illegible] knowledge: and this it would [illegible] to consider anything beside itself [illegible] itself.

[illegible] bears all the marks of a penultimate [illegible] still in the womb of reason, its [illegible] As its absolute is not *quite* the absolute [illegible] is not *quite* finite but in it finite and infinite [illegible] together and still awaiting the final [illegible] The best it can manage in the way of finite individuals are only make believe individuals [illegible] being, but they cannot be [illegible] from the absolute mind; in them it is God [illegible] ignorant of His own thought, their [illegible] and their error lacks just the distinguishing [illegible] *Theism alone can do* [illegible] *infinite.*

[illegible] being is the limit of thought [illegible] the inscribed polygon—[illegible] of the thought-system carries it towards [illegible] Truth is the correspondence of thought and being [illegible] more enlarged thought-system [illegible] than a less enlarged, just [illegible] of a million sides is nearer to the [illegible] triangle. To consider a truth as [illegible] is to consider it in an enlarged [illegible] enlarged thought-system; and a [illegible] thought-system stands to a less enlarged [illegible] representative of the being-system. We [illegible] of the relation of the cohe-

[illegible] Joachim's essay on *The Nature of Truth* (chap. IV, Monism) [illegible] my mind while writing this. It was from Mr. Joachim's essay that [illegible] the conception of pantheism as the penultimate [illegible] coherence theory of truth "suffers shipwreck at the entrance of the harbor."

rence and correspondence theories of truth and error, which is at the same time a reconciliation of them. Coherence is a test, in a certain sense the *test* of truth. Correspondence of thought and being is the *definition* of truth.

To understand in what consist finite truth and error. We may conceive God as [illegible] finite minds which He will further [illegible] with the capacity for becoming the centers of [illegible] thought-systems and being-systems [illegible] world—my world. These [illegible] *into* their places [illegible] homologous and [illegible] final system and [illegible] level, (and in [illegible] though finite [illegible] tical each for each [illegible] to God). Or else [illegible] tematically [illegible] epi-cyclic connection [illegible] final reality. In [illegible] their worlds will be [illegible]

The system of reality [illegible] physics alone as [illegible] infinite enlargement without [illegible] atic center. Every enlargement [illegible] direction of making it more [illegible] can be set up against it [illegible] subordinate system and [illegible] to deny. To conclude: [illegible] an empirical but as a necessary [illegible] *nequit.*" Therefore it is the [illegible]

LONDON, ENGLAND.

Compare Spinoza, [illegible]

THE CLASSIFICATION OF RELIGIONS.

INTRODUCTION.

Objective Illustrations: Their Sphere and Importance.

THERE is an old proverb which says: "Order is the first law of Heaven," and the consensus of men has long ago decided that the laws of Heaven should be the laws of earth. To labor without some law or system is to fore-ordain fruitless result, although to be always ordering, or to be tied to a system, is no whit better. The one is lawless disregard of just observances; the other is self-enforced slavery to imaginary needs and requirements or to principles held in exaggerated esteem. Somewhere between these lines lies a successful mean. System and classification are valuable, if they are used only as suggestion. They must never shape the facts, but the facts must shape them. Facts are many-sided and have many relations. No system or classification can do more than illustrate *some* of these. If it does this, it has an important value. If it cannot do this, it is valueless. If other phases and relations are to be suggested, another classification is necessary. Only shortsightedness will insist on the sufficiency of one arrangement. Different purposes must have their different methods. When system in the presentation of complex or abstract thought takes the form of classifications which may appeal to the eye, it has incalculable value. Nearly every topic can by the exercise of a little

ingenuity and energy be illustrated in an objective manner in which the interest may be heightened and the impression made more vivid and lasting. The justification and importance of such an attempt lie in the nature of our thought, so large a part of which is ordered in terms of space and time. When the eye can be brought to the aid of the imaging faculty a success may often be gained in the grasping of a thought which would otherwise be a failure. Again, when a map, a diagram, or analytic chart can be brought before the sight, not only are the above results accomplished, but that most important end of all education may be aided as in no other way, viz., the broadening of the mind, since in this way the scope of a subject and the internal and external relationships may be seen at a glance in their wholeness and fulness. Indeed, a good classification may do more in the way of suggestion and further stimulation for a susceptible mind than the most detailed explanation of the facts in a prosier way. For such reasons as these, the subjects we are here considering will be interspersed frequently with devices of various sorts helping to make less the tediousness of the recital of facts and aiding, it is hoped, towards an increase of interest and a broader understanding.

Some Recent Classifications of Religions.

The subject of Religion is exceptionally susceptible of classification. In recent times it has been often and in various ways attempted: sometimes from the point of view of the objects of worship, sometimes from historical sequences and characteristics, sometimes from certain philosophical standpoints or to illustrate certain underlying philosophical principles, and sometimes from an incongruous mixture of different principles. The various methods of classifications, so far as I have met them, fall severally under one of the four following headings:

A. Classifications from certain preconceived assumptions or standards of authority based on philosophical or theological dogma;

B. Classifications from external characteristics of the religions, i. e., from the character of their individual, objective features and beliefs, or their mere names and number of adherents;

C. Classifications from the subjective side based on a psychology of the subject, i. e., on the internal characteristics;

D. Classifications from racial relationships and from actually traceable mutual historical influences (including linguistic and other geneological schemes).

All of these methods of grouping (even those under A) have their value, often a very great one. They only overstep their province when they claim to be the sole legitimate method or even the best method. They can at *most* do what it is possible for a classification to do, viz., illustrate a certain general phase, relationship, tendency, etc. Each must in the nature of the case omit the special advantages of the others; yet through all, the general character of the subject may be seen, just as one can see and recognize the same landscape from different points of view, while in each new standpoint we get new and otherwise impossible impressions. He will know it best who is at pains to view it from all the available points. So in the study of religions, the most varied views should be most welcome, so long as they are not partial, overdrawn, or fantastically colored. Only by various classifications and methods of study is it possible to bring out the manifoldness of the great *idea*

A. CLASSIFICATIONS BASED ON DOGMATIC ASSUMPTIONS.

Under this heading may in general be placed all classifications which have occurred in Christendom down to quite recent times. This holds true of both the *most con-*

servative and liberal writers. Religions were of two classes: *true* and *false*. Christianity was true, all others (including its parent Judaism) were false; and to bring out the opprobrium of the contrast most fully the term "Heathenism" was applied to the extra-Christian world. The Jews would have dubbed them "Gentiles"; the Greeks, "Barbarians." If there was any apparent truth among the "heathen" it would be found in the end to be untrue, or it was claimed that evil was so mixed with it as to render its effects wholly bad. Neither in doctrine or cultus had Christendom anything to learn from Heathendom. To wicked priest-craft and to the Devil was assigned the origin of all its institutions. They took advantage of the fallen sinful condition of man, buried him with erroneous doctrines, and bound him in slavery to false worship and debasing superstitious practices. (Of course the writers themselves were members of the true.)

A second theory on this basis having the same meaning but couched in different terms, was that which classed religions as *natural* and *revealed*.* Yet in Christendom this was an advance on the former in two ways: first it enlarged the sphere of exclusiveness so that now both Judaism and Christianity were included on the side of revealed religions, while all others were invented or natural. Then again the terms of description and contrast were milder, although it was yet implied that the former were from God and the others from man (the Devil not receiving quite so large a share of credit). The natural religions however were in no way sufficient for man's needs. He had sunken from an original state of bliss and innocence to so low a condition that supernatural Divine interposition

* It must be observed, that from the point of view of the adherents of each religion, all the others are "false" and "natural" while theirs is "true" and "revealed." Hence *the* religion that should stand on the one side over against the others in the contrast of the legitimate against the illegitimate, would depend entirely on the birth-place of the classifier.

was necessary to prevent his utter ruin. The fatal consequences of sin could in no other way be counteracted. Hence we observe, the classing of religions was the outline of the theological or rather doctrinal attitude toward them. Theologians resting their faith on Church dogma could of course have no other view. Hence even the most liberal of them must hold this general attitude. James Foster in a sermon on "The Advantages of a Revelation," speaking of the condition of the world at the birth of Christ, says: "Just notions of God were, in general, erased from the minds of men. His worship was debased and polluted, and scarce any traces could be discerned of the genuine and immutable religion of nature." Here is an unusually liberal view of the so-called natural religion for a man of the eighteenth century, yet it contains the denial of even the comforts which this might have afforded to the men of those times. From men of philosophical tendencies the attitude was substantially the same. This could not be otherwise from the belief which men universally held regarding the moral and religious state of primitive man. They one and all believed him to have been originally perfect, they observed him to be far from that now. He must have been degraded. They read of things in history repulsive to their feelings and unseen in their circle of experience. They generalized this into the universal condition of the times alluded to. Distance in time and racial dislike gave the imagination scope, and the consequence was a theory anything but philosophical. John Locke, (1632-1704) one of the greatest if not the greatest English mind of his day, referring to the times of the beginning of the Christian era, says in his "Reasonableness of Christianity": "Men had given themselves up into the hands of their priests, to fill their heads with false notions of the Deity, and their worship with foolish rites, as they pleased; and what dread or craft once began, devotion soon made sacred,

and religion immutable." "In this state of darkness and ignorance of the true God, vice and superstition held the world." Heathendom, all and entire, morally and religiously was eschewed. Some of the Greek and Roman classical authors were good to read as literature, and a few writers upheld the study of Greek philosophy, notably the "Cambridge Platonists," while the Logic of Aristotle was generally in good repute.

But I must mention an opinion or two from Church history, that we may better see the prevalent teaching of the investigators and observe a further basis for this sort of classification. Johann Lorenz von Mosheim (1694-1755), one of the most widely read and influential writers during the latter half of the 18th century and the first half of the 19th, and a man revered for his great learning and sincerity by the general use of his text-books during a hundred years, says concerning this period in the first chapter of his "Church History": "All nations of the world, except the Jews, were plunged in the grossest superstitions. Some nations, indeed, went beyond others in impiety and absurdity, but all stood charged with irrationality and gross stupidity in matters of religion." "The worship of these deities consisted in ceremonies, sacrifices, and prayers. The ceremonies were, for the most part, absurd and ridiculous, and throughout debasing, obscene, and cruel. The prayers were truly insipid and void of piety, both in their form and matter." "The whole pagan system had not the least efficacy to produce and cherish virtuous emotions in the soul; because the gods and goddesses were patterns of vice, the priests bad men, and the doctrines false." (Quoted by J. F. Clarke, *Ten Great Religions*, 21st ed. B. 1884, pp. 5-6.)

A similar picture of the period spoken of may be found in Geikie's *Life and Words of Christ*. If space permitted, I should illustrate this attitude from writers who construct

their classification of present religions on this same basis. And yet it is so general an assumption that we need not ask to have it illustrated. The theory usually urged for sending and sustaining Christian missionaries in various parts of the world is an ever re-current witness of it. Moreover, if one is looking for the foundations of things, he may find this assumption at the bottom of a vast amount of the religious literature of our times. Without further comment upon it, I will add a few lines from Dr. J. F. Clarke (*Ten Great Religions,* p. 7) who in speaking of this attitude toward the "ethnic" religions says:

"Apply a similar theory to any other human institution, and how patent is its absurdity! Let a republican contend that all other forms of government—the patriarchal system, government by castes, the feudal system, absolute and limited monarchies, oligarchies, and aristocracies—are wholly useless and evil, and were the result of statecraft alone, with no root in human nature or the needs of man. Let one maintain that every system of *law* (except our own) was an invention of lawyers for private ends. Let one argue in the same way about medicine, and say that this is a pure system of quackery, devised by physicians in order to get a support out of the people for doing nothing. We should at once reply that, though error and ignorance may play a part in all these institutions, they cannot be based on error and ignorance only. Nothing which has not in it some elements of use can hold its position in the world during so long a time and over so wide a range. It is only reasonable to say the same of heathen or ethnic religions. . . . Unless they contained more of good than evil, they could not have kept their place. They partially satisfied a great hunger of the human heart. They exercised some restraint on human wilfulness and passion. They have directed, however imperfectly, the human conscience toward the right."

B. CLASSIFICATIONS FROM OBJECTIVE CHARACTERISTICS.

1. According to the Nature of the Objects Worshiped.

This is the most general classification of those inclined to be scholarly and broad. It not only has numerous representatives in books, but is probably the only one that can

CLASSIFICATION OF RELIGIONS ACCORDING TO THE NATURE OF THE OBJECTS WORSHIPED

NON-RELIGIOUS PEOPLES, OR A-THEISM.	
FETICHISM	Negroes of Central Africa Some S. Amer. Indians Australians, etc.
TOTEMISM	N. E. Asiatic Peoples N. Amer. Indians Some Polynesians Ancient Egyptians, etc.
SHAMANISM	Some N. Amer. Indians " N. Asiaticans " Papuans, Tamans, New Hebridians, etc. " Mohammedans, etc.
ANIMISM	An element intermixed in the religions of all peoples, but especially characteristic of Chinese, Ancient Greeks and Romans.
POLYTHEISM	Greeks, Romans, and Germans of Ancient Times All Ancient Semites Ancient Hindus Early Chinese and Japanese Aztec-Toltecs (Indeed, all religions, except Christianity, Mohammedanism, and Judaism, when contrasted with Monotheism.)
DUALISM	Persians (best representatives) Modern Hindus (in certain respects) Manichaeans of Middle Ages, Some Christian and Mohammedan theories
MONOTHEISM	Jews generally since prophetic times Higher religious conceptions in Ancient India, Modern Europe, and Mohammedan lands
MONISM	Upanishad and Vedanta Philosophers of India Lao-Tsze of China Eleatic School of Greece Many Modern Mystics: Bruno, Eckhardt, Böhme, etc. Idealists: Fichte, Schelling, Hegel, etc. Realists: Spinoza, etc.

be said to be popular among those classifications that deserve respect as aspiring to be scientific. Several of its divisions are in the most universal circulation, yet not all of them are so well understood, hence I shall give and explain them more fully than would otherwise be necessary. (See chart.)

1. *Non-religious Peoples,* if there be such, should be mentioned first. Many reputable authorities claim to have discovered tribes devoid of religious ideas. (See the works of Dr. Monnat, Sir Samuel Baker, David Livingstone, Sir Messenger Bradley, and Sir John Lubbock.) The testimony is disputed on the ground of its incompleteness and for other reasons, hence I will place no peoples under this topic. (Buddhism was at first an atheistic religion—i. e., in any of the usual senses.)

2. *Fetichism,* the worship of simple and casually selected objects which have come to be regarded as possessing in some way a superior power, such as stones, bones, shells, herbs, bits of wood, feathers, weapons, etc. In general, this is the religious condition of those peoples in the lowest stage of civilization, or the so-called "savage" state.

3. *Totemism* (or Nature Worship), the religious regard of objects of nature in a somewhat larger and less servile way, as of mountains, rocks, water, rivers, groves, trees, animals (serpents, cattle, etc.), and, in higher forms, the heavens, sun, moon, etc. This form of worship is found with peoples a stage higher than the last.

4. *Shamanism,* in which the deities are of the most diverse character, including the Fetichistic, Totemistic, and polytheistic orders; but the method of approaching them is through magical formulas, incantations, etc., the performance or recital of which is believed to exercise an authority over them. If properly carried out, it is believed to extort from them the fulfilment of the applicant's wishes, whether these be temporal present needs or the disclosure of future

events. This form of religion is thought to be the dominant characteristic of most of the so-called "barbarous nations."

5. *Animism,* or the worship of ancestral spirits, is the belief that the soul after death has special opportunities for doing good or evil to the living, and hence is to be honored or propitiated. It is very wide spread and can scarcely be said to be the characteristic form of any stage of development.

6. *Polytheism,* the worship of many gods. This is a term capable of covering the whole range of religion below monotheism, but which is best used to designate a stage in which the gods are not longer natural objects, but entities or spirits in or independent of these. It is the characteristic of the religion of peoples on the border of or somewhat advanced in civilization, the so-called "civilized peoples," as distinguished from the "enlightened" above and "savage" below.

7. *Dualism,* the belief in two deities, one benevolent the other malevolent, the form of religion that accounts for the good and the evil of the world by referring each to a supreme cause having a nature in accord with the character of its creations.

8. *Monotheism,* the faith that one all-wise, all-good, and almighty being alone created, guides and governs the universe for ultimate good ends. This Being is regarded as a spirit transcendent to or over against the world ot his creation. The type attained by the great majority of peoples in the most enlightened nations.

9. *Monism,* the view that the universe is a real unity in which the manifold diversity is only apparent; that the creating, guiding power and intelligence is immanent in it and not above or over against it; that the so-called material and spiritual are qualitatively the same (by one school all being regarded as material, by another as spiritual, and

by yet others the whole being spoken of as an unknown essence). This division has no representatives among nations or special peoples, but has been and is held by various individuals and schools of thought in various ages and various parts of the world. It embraces wide extremes, and must comprehend most of those included under the terms: idealists, phenomenalists, materialists, organicists, mystics, spiritists, etc.

* * *

It will be observed that these terms are none of them very definite, and that used combinedly in a classification they are loose. Their suggestiveness at best is somewhat vague, and without care is apt to be misleading, since it will be found that no people arranges itself exclusively under one of these headings, but that all of the varieties are found among the highest nations, while even the lowest peoples have some of the higher elements. Such religions as Confucianism and Buddhism, having the most numerous followings, really find no place in such a classification.

II. According to the Worshipers' Estimates of their Deities.

Sir John Lubbock, a careful student of ethnology and an investigator who has much to say worthy of hearing, objects to the usual classification of religions according to the nature of the objects worshiped. His method has somewhat of originality, though not more exact or by any means so different from the method he refuses, as he believed it to be. He proceeds to sort them over on the principle by which the deity is estimated by the worshipers. The result is a division of seven chief types. The first five are designated by terms in general use, the other two having no specific name. I will give the whole for what they may suggest. (See his *Origin of Civilization*, 4th ed., L., 1882, pp. 205-6.)

1. "*A-theism;* understanding by this term not a denial of the existence of a Deity, but an absence of any definite ideas on the subject."

2. "*Fetichism;* the stage in which man supposes he can force the deities to comply with his desires."

3. "*Nature-Worship* or *Totemism;* in which natural objects, trees, lakes, stones, animals, etc., are worshiped."

4. "*Shamanism;* in which the superior deities are far more powerful than man, and of a different nature. Their place of abode also is far away, and accessible only to Shamans."

5. "*Idolatry* or *Anthropomorphism*; in which the gods take still more completely the nature of men, being, however, more powerful. They are still amenable to persuasion; they are a part of nature, and not creators. They are represented by images or idols."

6. "In the next stage the deity is regarded as the author, not merely a part of nature. He becomes for the first time a really supernatural being."

7. "The last stage is that in which morality is associated with religion."

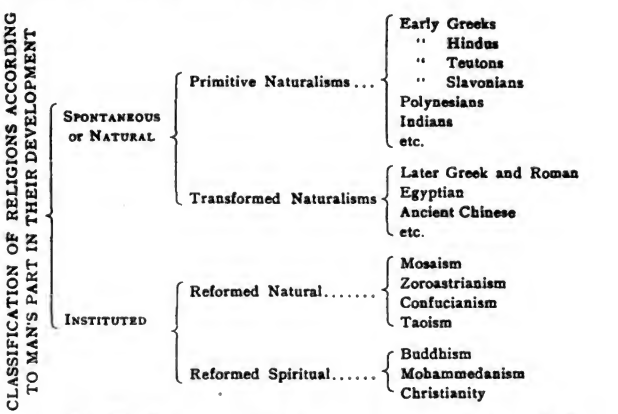
* * *

This classification attempts to proceed strictly on the basis of progress in the development of religious ideas. When practically applied, it is not less confusing than the former, and is equally inadequate to define the character of the religion of any given people; although in the last two divisions it makes useful discriminations.

III. According to the Part Played by Man in their Development.—Historical Method.

1. *Prof. W. D. Whitney,* the celebrated Sanskrit scholar and Orientalist of Yale College, has instituted the classification of religions into *National* and *Individual.* I will let him explain himself. In an essay entitled, "On the

So-called Science of Religion," he says: "There is no more marked distinction among religions than the one we are called upon to make between a race religion—which, like a language, is the collective product of the wisdom of a community, the unconscious growth of generations—and a religion proceeding from an individual founder, who, as leading representative of the better insight and feeling of his time (for otherwise he would meet with no success), makes head against formality and superstition, and recalls his fellowmen to sincere and intelligent faith in a new body of doctrines, of especially moral aspect, to which he himself gives shape and coherence. Of this origin are Zoroastrianism, Mohammedanism, Buddhism; and, from the point of view of the general historian of religions, whatever difference of character and authority he may recognize in its founder, Christianity belongs in the same class with them, as being an individual and universal religion, growing out of one that was limited to a race."



2. DR. FAIRBAIRN of Scotland, a man who has written and lectured considerably on the comparative study of re-

ligions, makes his classification on the same basis as that of Professor Whitney, viz., from the part man's conscious and individual intentions have played in bringing them to the condition in which we find them in history. (*Studies in the Philosophy of Religion and History.*) His terms are different, though meaning practically the same. He further subdivides the two main divisions, and, under these, religions are cited as examples. (See Chart.)

(1) *Spontaneous or Natural Religions,* those that have grown up out of a people collectively, e. g., the religion of ancient Greece. These he further subdivides into:

(*a*) Primitive Naturalisms.

(*b*) Transformed Naturalisms.

(2) *Instituted Religions,* or those which have their origin in some great personality, e. g., Buddhism, Zoroastrianism, Christianity, Mohammedanism, etc. This again is of two kinds:

(*a*) Reformed natural religions,

(*b*) Reformed spiritual religions.

Each of these divisions, he claims, shades into the others. Nature's gradations are too fine for our subtlest distinctions. The naturalisms bring forth the historical; the instituted presupposes the spontaneous.

This classification too, like the others, calls attention to certain facts which deserve notice. When not too carefully scrutinized the divisions offer useful intimations. There is a sense in which certain religions are more spontaneous than others, or than the same are at later times. The consciousness of man was not so active in early as in later times. Moreover the simpler and less conscious growths must have come to take on crystallized forms before the reforming recreative spirits could be operative, and these efforts of the reformers and founders have again a freshness and spontaneity which the same religion in later times does not possess. Indeed, the latter is then to

the former as an "instituted" to a "spontaneous" religion. Hence we perceive that in the end the division is only a very relative one, i. e., that it has no intrinsic basis in the nature of religions themselves, but only applies to temporal changes coming about sooner or later in the process of all religious development. Nor have the remarks "growing up out of the people collectively" and "originating in some great personality," any more than an intimative significance. They are not divisions which correspond literally to the facts. As to the first, it is only the darkness which hovers over the history of nations in early times that enables us to speak of spontaneous developments unaided by great personalities, if humanity was governed by the same general laws then that it has been within historic times (and we have no ground to assume otherwise). We must believe that compared with the rest of their contemporary fellowmen, there have every now and then lived in the world those great personalities which set in motion certain influences relatively, though not entirely, new. And this leads me to say of the second remark, viz., that about certain religions "originating in great personalities," that these great personalities are only in a very qualified sense their originators. They are possessed of a broader, deeper consciousness which takes up into itself the facts or light of their age better and more thoroughly than others; they see more plainly and clearly the way the experiences of mankind point; they draw more faithfully and truly the higher inductions of their times: hence they become to others the apparent originators, in some perhaps supernatural way, of great ideas and religions. To themselves and to those who can appreciate with them this fuller consciousness and those more farreaching inductions, they are not more a mystery than the rest of life's experience. It is only to the mass of smaller minds that they appear origi-

nators in that absolute sense, or that they come indeed later to be deified.

The remarks which are here passed are applicable alike to the two presentations of this basis of classifying religions. The classification is suggestive and helpful, but it is a mistake to suppose it either deeply grounded or final.

After writing the above my attention was called to the fact that Prof. Max Müller (although adopting a classification equally untenable when exclusively insisted upon) had objected to this method of classification before Professor Whitney's essay was published, on similar ground to that which is here taken, viz., that though neither Brahman, Greek, nor Roman could point to the founder of his religion, yet "the student of antiquity can still discover the influence of individual minds or schools or climates. If on the other hand we ask the founders of so-called individual religions, whether their doctrine is a new one, whether they preach a new God, we almost always receive a negative answer. Confucius emphatically asserts that he was a transmitter, not a maker; Buddha delights in representing himself as a mere link in a long chain of enlightened teachers; Christ declares that he came to fulfil, not to destroy the Law or the Prophets; and even Muhammed insisted on tracing his faith back to Abrāhym, i. e., Abraham, the friend of God, whom he called a Moslim, and not a Jew or Chrstian, (Koran iii, 60) and who, he maintained, had founded the temple at Mekka. To determine how much is peculiar to the supposed founder of a religion, how much he received from his predecessors, and how much was added by his disciples, is almost impossible; nay, it is perfectly true that no religion has ever struck root and lived, unless it found a congenial soil from which to draw its strength and support." (See *Science of Religion*, 140.)

Professor Tiele, objecting to this same method, asks, "What is the wisdom of a community but the wisdom of its

more enlightened members, that is, of individuals?" Every myth, rite, or eternal truth, in any religion was the work of an individual mind, and I must re-affirm that it is only from the fact of their lying so much in the dark, that we speak of unconscious growths and spontaneous generation.

Moreover, these founders could have no success if they were so supremely and vastly ahead of their people as is hinted. What they spoke was only waiting in others' hearts for a mouth-piece. It is just because their better insight gathers up into itself merely in clearer manner what many less clearly feel, because they are able to lend shape to the more advanced ideas which the community has already come up to and which are already agreeable to the minds of many as soon as expressed. Individuals are ever at work, and the community is ever making some sort of growth. The one is conscious, the other not; but neither goes on without being in a true sense the product of the other. Sometimes in the course of events the individual's opportunities are greater and his efforts shine forth in more glaring light, but the underlying relationship and bond of mutual dependence is never broken.

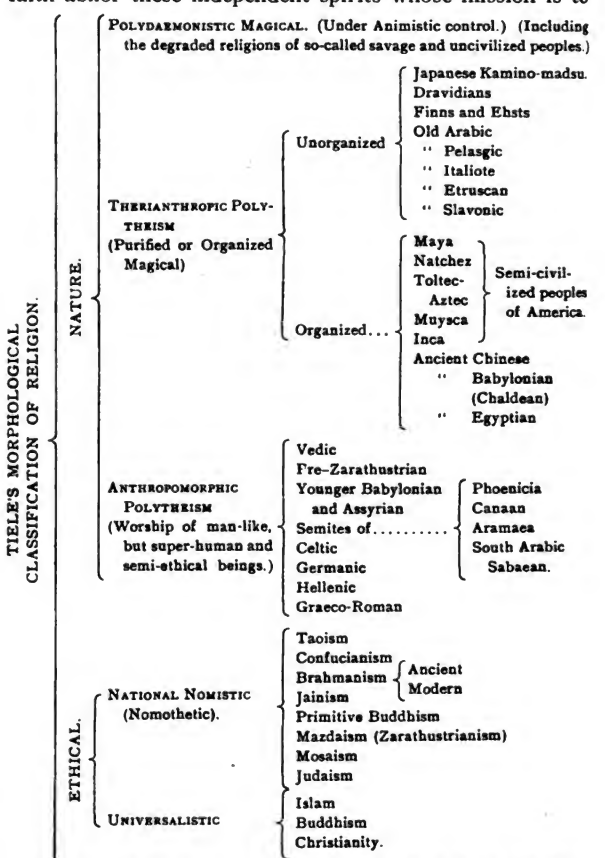
It must further be observed that in most cases these founders never shaped new bodies of doctrines, etc., but by inspiration of their life infused new and pregnant principles into others who later developed them into doctrines and founded upon them ceremonies, which in time became a great body of faith and practice, or another religion.

3. Professor Tiele, starting from this same external historic characteristic, has developed a classification far more tenable than either that of Professor Whitney or of Dr. Fairbairn. (See *Outlines of the History of Religion to the Spread of the Universal Religions.* Tr. by J. E. Carpenter, L. 1877. [New ed. in Dutch and German.] Also especially, his later statement in *Encyc. Brit.*, 9th ed. art. "Religion.") This comes from the fact that he has

penetrated beneath this external shell to the deeper meaning. He has, in the process, gone away from the mere historic phenomena to a philosophical distinction which is to be made between them. Nevertheless his treatment must be placed with historical classifications, because he looks at this difference as one that has come about in the process of development; in other words, the difference between his two great classes, though one intrinsic in kind, is at bottom evolutionally considered a difference of degrees or stages. The higher was once on the same stage in which we find the lower; the lower in course of time would naturally reach the higher. He claims that the essence of such divisions as that made by Prof. Whitney is true. "The principle of the one category is *nature*, that of the other *ethics*." Hence he makes these the basis of his "morphological" classification of religions. (See *Encyc. Brit.* 9th ed. "Religion." See also accompanying chart.)

With great differences in their degrees of elevation, the *nature religions* agree fundamentally in the fact that the supreme gods are "the mighty powers of nature, be they demons, spirits, or men-like beings, and ever so highly exalted." They are subject to change and progress through the unconscious drift of public opinion, and by the conscious alterations and additions of foreign modes of worship. "Gods are more and more anthropomorphized; rites, humanized." Then too they are susceptible of a moral progress, which begins by ascribing ethical attributes to the highest gods. Farther on in the more advanced stages of nature worship, ethical abstractions are personified, deified, and worshiped, at first indiscriminately and indistinguishably intermixed with the nature gods. By and by the stronger and clearer minds (the philosophers, sages, prophets) begin to perceive the difference. To them the latest elements or deities are of overshadowing—indeed of sole—importance. They preach the predominance of

the moral. Persecution ensues. The defenders of the old faith abhor these independent spirits whose mission is to



them mere destruction. They speak in derision of the pure abstractions by which these innovators would dethrone

the old and trusted gods of the fathers, and if the ancient faith has not lost too greatly its hold on the masses (as it generally has not at these early stages), these high thinkers —Socrates, Jesus, etc.—may pay the penalty of their elevation by premature and violent deaths. These simpler and more sensuous faiths with true instincts perceive the danger to the old traditions if such doubt and preaching are allowed to go on unmolested. A little infiltration may be tolerated, may indeed give an agreeable vivacity to religious life; "but the reform must not exceed certain limits," for if it does, the old forms would plainly become superfluous. Finally when the new ideas have become wide-spread enough, the old ones meet the doom which from the first awaited them. No help can do more than make the process gradual; no arguments, however specious, no claims of sacredness, no assertions about superiority or universality can make head against the on-coming intellectual tendency. "No political power, no mighty priesthood, no poetry, no mysticism like that of the Neo-Platonists, no romanticism like that of Julian, not even an attempt to imitate the organization and the rites of an ethical religion, can save it any longer from utter decay."

The tide of religious conception is now turned. The old nature religion may now be considered as advanced to the stage of an ethical religion, in that the predominant characteristic has changed. The traditional naturistic elements are not wholly set aside or excluded, but they are subordinated and assume somewhat of ethical functions. The more important of the old nature gods survive, but no longer occupy first places and dominate. On the contrary they take menial positions, become serving spirits, ministers, angels (ἄγγελοι, *yazatas,* etc.) before the supreme moral Orderer of the universe. A great breadth of conception has entered in. Man views the world not so much in its former conflicting diversities. The natur-

istic religious standpoint has been reversed. The polydæmonistic and polytheistic character is tending to monotheism. The polytheism is at least becoming organized and monarchical. To this is added greater individualism among the adherents. Conscious speculation, imagination and reflection increase. Growth goes on more by these than by unconscious national accumulation or change. Some higher central notion of a more definite sort of salvation to be attained comes into prominence. Organization for the purpose of fostering and propagating this idea takes place. Men bind themselves more closely together to aid in practicing it, and the religion is finally "instituted or organized" by later hands; while we may merely say it was "founded" by or received its original impulse from an individual or body of priests or teachers. These later organizers always ascribe to the "founders" a high standing in relationship with the Divine. They stand as inspired prophets to whom the Deity has revealed his will, as messengers expressly sent to direct men, as sons of the gods instructed with various missions, or indeed, as incarnations of God himself. So much on the general divisions of the topic.

Subdivision of Nature Religions. (See chart). Professor Tiele calls the very earliest stage of religion the *Polyzoic*. This he does not place in the outline, since we have no information concerning it. He thinks "man, in that primitive stage, must have regarded the natural phenomena, on which his life and welfare depend, as living beings endowed with superhuman magical power; and his imagination, as yet uncontrolled by observation and reasoning, must frequently have given them the shape of frightful animals, monstrous portentous mythical beings, some of which still survive in the later mythologies."

The earliest stage with which we have an acquaintance, he names the *Polydaemonistic Magical*. Animism is the

predominating characteristic, though the religion is not mere animism. Animism is a sort of primitive philosophy. The primitive mind has come to believe in a spirit which is superior to the body. This he extends to the phenomena of nature by supposing them to be the work of spirits of departed men. This is extended till everything living, moving, startling, extraordinary, is finally attributed as the work of mighty spirits moving freely here and there and abiding either permanently or temporarily in this or that object or region. The most powerful among them come to attain in man's mind the rank of divine beings, and are worshiped either as invisible or embodied spirits (spiritism or fetichism). Three special characteristics of this stage are noticeable: (1) Its confused and indeterminate mythology, though some spirits are more powerful than others, especially the heavenly, and in general there is a supreme spirit of heaven who is mightiest of all; (2) The implicit confidence in magic through which sorcerers and fetich-priests come to be held in such veneration; and (3) The predominance of fear over all other feelings and the doing of religious acts generally for selfish ends.

Therianthropic Polytheism is the name given to the next higher stage. The name is intended to describe the character in which the gods usually appear, viz., in the forms of animals and men, yet predominantly the former. They are really spiritual conceptions embodying themselves in these ways. Animal worship is everywhere in such religions a prominent characteristic. The gods are represented as men with animal heads, or as animals with human heads. Such religions have yet an element of magic, but it is in the hands of an organized priesthood, hence they are characterized as purified or organized magical religions. These practices are forbidden to private sorcerers, and in the hands of the priesthood have a developed ritual.

Some are very highly organized, others little. Some approximate very closely to the next higher stage of pure anthropomorphism, others closely to the next lower, of animistic predominance. In the former there is a strong tendency to monotheism, accompanied by a sort of theocratic government in which the king is the living representative of the king of the gods.

Next in order are the *Anthropomorphic Polytheisms*, the highest stage in the naturistic religions. These, as well as all the higher forms, contain many survivals of the characteristics of the earlier stages, yet those features have been adapted to newer ones and no longer predominate, and consequently the religion deserves another name. The gods are now all superhuman and manlike, rulers of nature, effecting good and evil. They are more ethical than the former, yet the mythology is sensual in character. Wars, wooings, revelries, and the lowest passionate indulgences are exceedingly frequent. Such myths, of course, were shocking to graver thinkers, but they formed the staple for the masses till the time of naturistic religious decay. "Not one of the religions in the polytheistic stage was able to elevate itself to the purely ethical standpoint; but, as moral consciousness went on increasing, deeper and more ethical religious ideas gathered round the persons of the most humane gods, the beloved son or daughter of the supreme deity, and gave rise to purer modes of worship which seemed to be forebodings of a time to come."

Subdivision of Ethical Religions.—The question of subdividing this class into *Nomistic* and *Universalistic* religions has called forth considerable discussion. The essential difference consists in the features that the former are based on sacred law drawn from sacred books, while the latter start from principles and maxims. (On the soundness of this asserted difference more will be said later.) Professor Kuenen used the expression "National Religions and Uni-

versal Religions" as the title of his Hibbert Lectures, (1882). He excluded Islam from the latter. Several other terms have been proposed for this class. Among the rest "world religions" and "world churches." The latter title was given by Professor Rauwenhoff (*Theol. Tijdschrift,* 1885, No. 1), who, however, rejects this method of classification. Professor Tiele himself would not use the term "world religions," unless as a sort of practical designation "to distinguish the three religions which have found their way to different races and peoples and all of which profess the intention to conquer the world, from such communities as are generally limited to a single race or nation, and, where they have extended farther, have done so only in the train of, and in connection with, a superior civilization." He granted that strictly speaking there can be only one world or universal religion. No religion has any claim to such a title from its achievements, whatever it may have in it potentially. Hence he adopted the more modest title "universalistic," in place of "universal" or "world," religions. Buddhism and Christianity are distinguished from Confucianism, Brahmanism, Jainism, Mazdaism, and Judaism, by their missionary spirit. The latter, after each becoming the religion of a single race, have ceased to spread, and after centuries of stiffening into dogmatism and formalism are slowly fading away; while the former number their adherents by hundreds of millions, are spreading among different races, and are rapidly making inroads upon the territory of other faiths.

This, said Professor Tiele, "cannot be due to some fortuitous or external circumstances only, but must have its principal cause in the very nature of each sort of religion." By other terms he described the one class as "nationalistic" or "particularistic" in contrast with the "universalistic." The three religions belonging to the latter class aspire to represent religious ideas which were not limited to the

nation's horizon, but which would have an interest for humanity, which would bespeak the general aspirations of the human heart. For this reason, two of these religions were rejected by the peoples to which their founders belonged by birth, and the third one, Mohammedanism, though founded by an Arab, derived its fundamental ideas from Jews and Christians and was raised to its high position by Persians and other peoples. Its unnational character is shown in the fact that its converts, whether made by force of arms or by missionary exertions, enjoy on embracing Islam the same rights and dignities as Arabs. So too Buddhism "looks for the man, the miseries of existence beset all alike, its law is a law of grace for all." That so broad is the Christian aim at its best, need not be here supported.

Though not on the same level, these religions are classed together because of their resemblance in origin and aim. Islam and Buddhism are only relatively universalistic, each showing the onesided religious development of its race at its highest. Islam emphasizes the absoluteness of the divine side at the expense of the human. Man is of no importance, hence he has but one duty, obedience. In such a system ethics cannot develop. Society must be conducted on a despotic basis. Buddhism puts the stress wholly on the human side. It knows no divine. Man must save himself by his own exertions. Self-renunciation, full and entire, is the way of escape from the miseries of life. The more truly religious has no place; or if it develops at all, it results in a childish fantastic mythology.

On Professor Pfleiderer's basis, that religion is the synthesis of dependence and liberty, Islam represents the former, Buddhism the latter. (Cf. this with Pfleiderer's classification farther on.) Christianity in its purest forms

fuses the two, dependence and liberty, the divine and the human, religion and ethics, into a real unity.

We have in this classification, on the whole, the most profound and profitable grouping thus far considered. In its development we receive many valuable suggestions. But good as we see it to be, satisfied or flattered as we may feel ourselves over the result, still we must as far as possible look at all the facts in these matters, and be governed as little as possible by our prejudices, desires, and the circumstances of where and under what influences we were born. In the spirit of such an outlook and such an attempt, several things must be said about this classification.

In the first place, to distinguish between *nomistic* and *universalistic* ethical religions on the ground given, is practically to make distinctions on the basis of features where there is no essential difference. Buddhism, Christianity, and Mohammedanism are each as truly sacred book religions as Confucianism, Judaism, etc. But they are in addition what he describes them—religions based on principles and maxims, on great central dominating ideas. This more definite characteristic, together with the facts that their bodies of doctrine cluster around distinct personalities, and that they have operated under more favorable opportunities as to civilization and coincidences in time, have largely occasioned their superior successes. He admits that other religions have extended farther than their race limits "in the train of or in connection with superior civilization."

He distinguishes Buddhism and Christianity from the others by the fact that they are trying to make proselytes, while the others are doing so no more. But Islam cannot be excluded from this desire and activity. Again, the contrast shown between this feeling in their adherents and its absence in those of others, is due more to the superior moral development of those of their peoples who are so

engaged, than to an essentially restrictive national character of the religious side of those religions who are not so engaged. I say *religious side* of the religions, because we must not in our enthusiasm over and emphasis of the morality connected with a religion forget that this does not constitute the whole religion. Religion has its moral side, but morals are not religion. Religion should no doubt be helpful in the development of morals; but though it be of inestimable importance, this must not reach an eclipsing character. To make religion morality, and then to make morality our kind of morality, would be an easy way to decide that some peoples are devoid of both. But this is not science. When we say, this or that religion is not making proselytes, we must look for reasons before deciding that this is an intrinsic defect in the religion *per se*. It may be, as above indicated, from lack of moral development of the beneficent unselfish feeling of the people quite apart from any thing which the religious outlook alone would necessitate. It may be from other circumstances beyond the power of the votaries to hinder, e. g., we know that many religions are in a state of decay brought about by the destruction of their political support and by persecutions. Sometimes it may be from poverty of material resources to undertake. Sometimes, alas, by internal dogmatic development and formalistic decay. But from this last we must confess that the great missionary religions have not been free, and have in some countries hardened into as dead and disinterested a formalism as others. Witness Spain, Turkey, and Ceylon. Nor can we be at all certain that their fate would have been measurably different among those races, climates and environments where we find dormant and fading faiths. It may even be doubted whether the great religions accompanied by their best representative peoples would have maintained a living progressive faith under such political and climatic circum-

stances during thousands of years. It must be further observed, that below certain limits of intelligence, men will believe what they are taught. Men of faith would find no difficulty in being men of another faith, if the fates of life had put them in such an environment. It is only when a high degree of individuality of thought has made them think for themselves, that a religion becomes unbearable.

Along this same line of thought, his remark that the three universalistic religions were representatives of religious ideas which had in view not the special religious wants of the nation, but the more general aspirations of humanity, can scarcely be admitted as sound. Every devotee of every distinct faith or sect in the world believes that his religion represents *just such ideas* as would be of general interest to the race, if only he could get the race to see its interest and its duty of accepting his belief. He pities, deplores, complains, exhorts, or despairs and damns, according to the doctrines of his order, those who do not.

It is going too far to say that Buddhism and Christianity were rejected by the peoples to whom their founders belonged because they represented universalistic rather than national ideas. As stated above, the parent religions were full of the faith that their teachings were just such as the world as a whole needed, indeed must have, if it ever received salvation. Rather was it because the new faiths rejected and despised the old means, that they themselves were spurned and persecuted by the parent religions. It is true, they were a great advance in sympathy toward the world, and hence also a liberalized outlook. The new way of looking at religion filled the early adherents with new enthusiasm, new hope, and new confidence that the world could be brought to see and believe in this way (as new ways of looking at any cause, in or out of religion, always inspires to this); but that they any more seriously than

their predecessors in the old faith believed themselves to possess religious ideas of world-wide rather than national interest, is erroneous, and results in a denial to the old faiths of that which is essential to any and every faith. The faith of any individual or any people must necessarily in his or their mind be the faith for the world. If he or they do not preach it, it is either because external circumstances do not permit, because it lacks definiteness and clearness in the believer's own mind, or because they are so engrossed in its formalities as to be oblivious to what if conscious they would regard as others needs. If those founders of new religions had sought to generate a world-wide enthusiasm over the old lines and methods, history teaches us that they would never have been cast off. They cast themselves off before others cast them off. The founders and establishers opened the conflict by an absolute renunciation of the forms of the current religion. It might have been difficult, perhaps practically impossible, to have brought forward the new ideas with the continuance of all the old forms and methods. It is a historic fact that the idea which each of these three great faiths embodied was taken up by parties within the old religions, but only to a very limited extent were they successful. Why they were not more so, would be very difficult to ascertain. In Jainism we have the "national" form of the Buddhistic idea; in Ebionitism that of Christianity; and possibly in the Wahhabites that of Islam. Perhaps at certain junctures of conditions a complete break with the old is the very best that can be done, although in general growth up, out of, and above is healthier, more enduring, and apt to be more wide-spread than reform by reaction and opposition. However, this is not here our present concern, but merely to see, in the truest light we can, why these faiths were not more lastingly successful among their own peoples. There might be many other reasons given. I will mention only

one, regarding the attitude of Judaism to Christianity, viz., that the position or too close relationship to God which both Jesus himself claimed and his followers who wrought out the doctrines more fully demanded for his personality, was revolting to the highly developed Jewish monotheistic sense of that time. The development of the conception as to the person of Christ had come about with the aid of ideas then prevalent which had their origin in Greek semi-mythological philosophy. The Jewish Semites had had for centuries no taste for mythology. The Prophets had drilled them into loyalty to Jehovah alone. He had no progeny nor co-rulers. Pauline theology set Christ up as his deity son, made him in many respects equal with God, and assigned to him a conspicuous part in the moral government and management of the world. Indeed, the primitive Christian idea added a new feature to the character of the Deity, but instead of putting it into the character of Jehovah, it embodied it in a new god or personage which it set up beside him. In this difference and claim alone we have nearly a sufficient explanation of the Jewish rejection of the new faith. To our day, this has remained the great and all hindering objection to Christianity by the Children of Israel. From their standpoint, it had its basis in mythology and idolatry; and since the days when the Decalogue was written, nothing has been more repugnant to a faithful son of Abraham than these.

Ethically the new faiths have, speaking in a general way, an intrinsic advantage, and this advantage was a natural outgrowth of the circumstance of an improving social development in the time of their origins. (See Prof. J. R. Seeley's *Ecce Homo* for an excellent exposition of the social and moral causes at work in the Roman Empire at the beginning of the Christian era.) Moreover, this ethical advantage of these faiths would have availed nothing, had it not been for the indispensable aid afforded to their

success by the improving social and ethical relations. But we must again remind ourselves, that however important ethics may be for the practical every-day purposes of life, ethics is not all of religion. A classification might be made on the basis of the metaphysical characteristics of the objects of faith, in which case it would be impossible by the best results of our highest philosophy and science to sustain the assertion that these three great religions are more "universalistic" or more true to the facts than Brahmanism, Confucianism, or Mazdaism. Philosophy and Science have scarcely settled the question as to whether the truth lies with monistic idealism, monistic realism, or dualism. Nor have they been able to decide positively which is the more inspiring as a philosophy of life. Until something more definite is agreed upon regarding this more religious side of religion, it will not do for us to be too dogmatic in our assertions of superiority here or there merely on ethical grounds. Down to the present, ethics have been the feature of apparently greatest importance, yet we are not in the least sure but that when society shall have reached a relatively high moral development in which the crying demands of "live and let live" are heeded without great exertion, the ethical feature of religion will sink to be a matter of minor significance.

And now a final remark as to the confusion regarding the meaning of such terms as Christianity, Buddhism, etc. If, e. g., we mean by Christianity the teachings of its founder and establishers, we are constantly in danger of confounding (if we do not actually do so) the objective metaphysical and physical sides of that early (and to us the genuine) Christianity with nineteenth century ideas of theism and the universe. On a second thought, after turning to history, we perceive that increasing knowledge of facts and laws is gradually supplanting the early Christian ideas of the universe and with this changing the conception

of God. Again, if we mean by Christianity the standards of thought and duty of to-day prevalent among enlightened nations, the body of belief regarding the universe and man's relation to it and to his fellows, we perceive that we have undermined the ground of our frequent appeal to the original type as authority. For except in the spirit of sympathy, love or universal brotherhood, which is the common ideal of the two, they are as different as 1800 years of varying fortune could make them. Hence our appeal must take the character of a resource for inspiration and a refreshment of courage. Whichever or whatever our position may be, we should endeavor to avoid the fallacy of such an incoherent mixing of facts and principles and periods as that so often met with.

[TO BE CONTINUED.]

THE JONAH LEGEND IN INDIA.

STUDENTS of the Old Testament may be interested in learning about a migration of the Jonah Legend eastward into India.

Two versions of it occur in the Tibetan work *bKa-babs bdun-ldan*, a History of Buddhism in India from the eleventh century A. D. to the reign of Akbar, written by the Lama Tāranātha in 1600.[1] This author is well known to students of Buddhism by another work on the history of Buddhism in India compiled in 1608, which has become easily accessible by the Russian translation of W. Wassiljef and a German version of Anton Schiefner. The former book represents the continuation of the latter.

The legends refer to the late period of Buddhism characterized by a group of eighty-four saints or rather sorcerers known under the designation Mahāsiddha. Their activity seems to embrace the time roughly from the eleventh to the thirteenth century. They play an important rôle in the mythology of Lamaism.[2] One version of the legend is connected with the name of Naropa who, in all likelihood, died in A. D. 1035.[3] The story is very brief. Naropa, says our text (p. 37, 7), had consecrated a Man-

[1] The Tibetan text has been edited by the Pandit Sarat Chandra Das at Darjeeling (printed at the Bengal Secretariat Press), 1895, 76 pp. The book has not yet been translated.

[2] A. Grünwedel, *Mythologie des Buddhismus in Tibet und der Mongolei*, p. 40.

[3] This date has been computed by E. Schlagintweit, *Abhandlungen der Bayer. Akademie*, 1896, p. 602.

dala of the God Hevajra[4] and studied certain methods of meditation, and while he once was in a state of contemplation, he was carried away by a stream and swallowed by a fish; but as he perceived in the belly of the fish the Mandala of Heruka,[5] he did not suffer any harm and was cast out again.

The other story (p. 58, 1) is somewhat more detailed. "Minapa (i. e., the fisher), a pupil of the Saint Kakkutipa, was a fisherman in Kāmarūpa in the east of India. While he used to meditate a little after the 'wind' method,[6] as practised by the fishermen, he once threw his fishing-hook at a fish, and pulling the line, he was snatched and swallowed by the fish. By virtue of his deeds and meditations, however, he did not die, but drifted on the river Rohita towards Kāmarūpa. There, on the little hill Umagiri, Maheçvara[7] preached to the goddess Umā[8] instructions on the 'wind' Yoga. As the fish came into that river, the fisherman in the belly of the fish listened to the sermon, meditated, and obtained many accomplishments (*guna*). It once happened that this fish was caught by fishermen and killed, when a man turned out. The former king had then already died, and meanwhile, since the birth of his (Minapa's) son, thirteen years had elapsed: thus it was found that he had spent twelve years in the belly of the fish. Thereupon, father and son betook themselves to the master Carpatipa, requested a sermon from him, meditated, and obtained both the siddhi. The father is known as the Siddha Minapa, the son is called the Siddha Ma-ts'in-dra-

[4] Grünwedel, *loc. cit.*, pp. 104, 105.

[5] Identical with Hevajra. See Schiefner, *Tāranātha*, p. 233.

[6] A term of mysticism denoting the drawing in and holding one's breath to prepare for meditation and finally the power of holding back one's breath for a great length of time, by which faculty miracles and many extraordinary things may be performed, not only those of religious significance, but also of good practical purposes, as in the above case the method of the fishermen is doubtless suggestive of a good catch of fish. See also R. Garbe, *Sāmkhya und Yoga*, pp. 44 et seq.

[7] Shiva. [8] Shiva's consort.

pa." The latter word is apparently identical with the Sanskrit *matsyendra*, "the lord of the fish."

As traditions of men being swallowed by a fish seem not to be found in ancient India, and as the above two stories relate to a period when Mohammedan power was established, we shall probably not err in supposing that it may have been the Arabs who spread the story in India. Indeed, the legend of Jonah is narrated in the Koran (Sūrah, XXXVII, 139-148) and quoted in four other passages of it.[9]

DR. BERTHOLD LAUFER.

NEW YORK.

[9] See Hughes, *Dictionary of Islam*, p. 249.

CRITICISMS AND DISCUSSIONS.

A LETTER FROM DR. PAUL TOPINARD.

The last numbers of *The Monist* and *Open Court* gave me such satisfaction that I cannot resist the temptation to express it to you. Please accept my congratulations on the evolution which I perceive in these magazines since their foundation. They answer perfectly the purpose of the founders to help in furthering the evolution of thought throughout the world, in the search for truth and its best application to the welfare of humanity.

Some years ago you invited me to publish my attitude toward the religious problem. I did not answer then because I thought I was not ready for it, I believed that the difference between us was too great. I was puzzled with your use of the word "form" in distinction from the meaning of it to which I was accustomed, that is, as a synonym for the physical shape of a body. But in the meantime I have read all your editorial articles, particularly your answer to Mr. Schumaker which made a different impression on me than your answer some years ago to Mr. Hyacinthe Loyson; and now I understand you perfectly I believe.

No doubt we have the same aim, but we differ in two points: first, your purpose is philosophy, mine is application. Secondly, you proceed in your reasoning by idealistic conceptions and I by materialistic observation and induction.

Your normative factors of existence are the "ideas" of Plato. Your God is their prototype, the central, the highest, whether in the universe or in oneself. The soul is a portion of Him, transitory in our brain but imperishable. Physicists would say it is energy. You add that those normative factors are realities, but that the man untrained in abstract thought cannot comprehend them. Well, I must say I am among those untrained and I have great difficulty in comprehending as realities in my brain those things which are not physical. Notwithstanding, your pantheistic conception of nomotheism

and entheism pleases me; that is, of a God everywhere, even in ourselves. But it is only a philosophical view and does not meet the demands of experience. Such a God can not be supplicated and invoked, nor your "immortal" soul which is but a portion of the universal spirit.

In fact after long meditation and in spite of the fact that I belong to a group systematically anti-religious, anthropology understood in its wide acceptation has led me to the conclusion that a faith is necessary for utilitarian purposes. The very great majority has need of it, viz., children until, let us say the age of ten years, a premature skepticism tending to make anarchists of them; women, in whom sentiment is a requisite of their special function of reproduction; the downtrodden, such as slaves; and those broken-hearted by great natural misfortunes. I do not include the unsuccessful in the struggle for life, for every one must reap what he has sown, must receive the full effects of his acts. It is the penalty of responsibility.

But on what foundations can we base that faith? The best certainly would be the ordinary conception of God as the Creator and governor of the universe, whom we can supplicate and invoke, and the conception of our ego surviving to receive just retribution for our thoughts and deeds on earth. Philosophers have built systems to support these conceptions, among which the most rational are nomotheism and entheism. Churches have done the same, either at some definite time or gradually: at some definite time through a prophet or God-man who said or believed that his was the divine mission to proclaim the revelation or *Logos* of God; or through a simple man who preaches from his heart and who is the product of his surroundings, his personal education and hereditary predisposition, to whose ministrations the churches then add the rites and ceremonies so necessary to the common people. But science has never given its sanction to these conceptions. Neither can energy be said to be the God we dream of and need; the ego or soul begins with the first sensation of the child and ends with the last breath of the individual, young or old.

Now these two conceptions are really indispensable. China, putting aside Lao-tze and Buddha, has not a supernatural faith. The religion of Confucius is only an ethical system built up on that which flourished in the time of the emperors Yu Ki, Yao and Shun. The national religion in China is filial piety, the worship of ancestors and benefactors of the race, the earliest progenitor in prehistoric

times being the son of the heavens. Some may think that such a religion is the cause of China's deadlock in civilization although so advanced some 4500 years ago. But in my opinion it is the Chinese language and system of writing which retarded China's progress, the introduction of Buddhism serving to confirm the results.

Shall I speak of other conceptions or abstractions which have been or might have been held up as a sort of idol, that is to say anthropomorphized and surrounded with rites and ceremonies so that the people would form the habit of considering them as a guardian or fetish to which they may appeal and which they can adore? First among such ideas stands Plato's conception of the Supreme Good, that is the perfection uniting the true, the good and the beautiful. Next the conception of virtue or of wisdom so much talked of, especially by the Stoics. Reason worshiped by the first French republic is in the same category. Such also would be the Utopian conception of universal altruism or fraternity, of solidarity, of equality of all classes and all men (a senseless idea since there is no equality in nature), of collectivism, etc.

The best concept, I must say, to take a synonym of God would be justice so much sought after by the Jews and finding its consummation in the eschatology of the Persians. But its non-existence around us is too evident. My definition of it is this: Justice is in our mind the consecration of human responsibility; it is receiving what is due to oneself and to others, the full effects of conduct.

All those conceptions are more or less included in God-nature or God-cosmic-order. They are attributes or secondary aspects of Him, your superreal factors of life. They all answer to the same disposition or need of a faith for man. This view of yours is quite ingenious and I accept it. Then we are not atheists, we understand God in a wider sense, higher than in the ordinary orthodox manner, that is all.

Another idea, conscience, approximates your soul or entheism in the same way. It corresponds to that of the Christ-ideal of which you speak, that will remain after the historical Christ as the best guide for virtuous conduct.

I will not stop here to discuss your consciousness in your interesting article in *The Monist* of January, 1908. ("Mysticism" also is interesting). Conscience, in common opinion, is the inner voice which more or less imperatively tells us what we must do or not do. In my opinion conscience is the physiological product, accumulated and

confirmed by heredity, of those demands of social life, which a long experience of man has recognized in the course of centuries and ages. They are the hereditary habits of Spencer, myself and others, which in animals are called instincts. Their origin does not trouble your consciousness of the ego and entheism. Although conscience can not be worshiped or invoked it can be heeded. Is it not after all the virtue or wisdom taught by a long experience?

Now leaving the speculative considerations, what is to be done at the present time? Must we proceed by a revolution or be opportunists and continue the evolution whose course hitherto has been as follows:

(1) Naturalism leading to polytheism; (2) Local and national gods, each proclaimed as the only and the best; (3) Monotheism, one of these gods such as Yahveh taking the head. The evolution of the religious need made a great advance at the beginning of the Roman empire, and another at the time of Luther. At the present time another and greater advance is in progress. Oriental archeology, the two last volumes of Loisy on the Synopsis, and such articles as those of *The Monist* and *The Open Court* show that the day is near. A few years ago in Switzerland I had a private talk with an illustrious Protestant professor of theology, and put the following question to him:

There are two systems in Christian Churches, one of them has its foundation exclusively on the Bible whose influence is melting away; the other is founded on decrees (decretals, true or false). whose supporters would die rather than make the least concession to modern thought. Is it not the duty of the most liberal in the first to take the lead and start the movement forward?

In *The Open Court* of November, 1907, you wrote in excellent terms that it would not be wise to make too rapid an advance and that the churches must be given time. You suggest that it would be better to cling to the most liberal of Christ ideals, and you accept the proposition of Mr. Bell to have instead of the Bible a book of compilations gathered from all sources, containing suitable teachings and sentences from Jesus, Paul, Confucius, Zarathushtra, Socrates, Marcus Aurelius, etc. I would add even prophets of primitive people and modern authors. A few days ago I was reading the six first chapters of the *Didache* or Teaching of the Apostles, which contains very good suggestions for daily conduct. The habit would be slowly formed of seeking ethical standards in this collection instead of in the Gospels which are not always clear to the reader.

Afterwards other modes of procedure would be found which would at last bring about the best universal religion combined with the best universal ethics in accordance with the happiness of mankind.

I spoke above of a revolutionary method which would be less slow. I hardly dare say what I was thinking. Well, it would tend to the practice of filial piety, the cultivation of the family and the worship of benefactors of mankind, as in China but with better position given to women. Before long the institution of the family will be entirely lost in our countries if we do not strengthen it and make it the palladium of society. Surely families are not eternal and do not realize immortality; but by his ancestors a father extends one hand to the past and by his descendants stretches one hand towards the future. An old man on the eve of his death thinks that his good deeds will be an example and capital for his posterity. Beside this consideration does it not also favor the physiological end of the genus *homo*?

But would it not be possible to combine the systems: (1) Christ as a center, as we would take Tell or Osiris, because his name is widely popular, and as a synonym of duty or wisdom, the product of man's experience in the course of ages; (2) the religion of filial piety and the worship of benefactors in ethics. It is the business of the laity to study the question.

Now both Mr. Bell and yourself are under an illusion. You believe that it will be possible at some remote time to build up a practical religion or church on the foundation of eternal truths; but truths are the property of scientists and philosophers, and not fully accessible to the great majority for whom the churches are intended. One of my conclusions in anthropology is that the always persistent animal nature of man is in contradiction with the requirements of social life. It is only through laws supported by a police that our ego recognizes that concessions must be made to others, in order to have the benefit of reciprocal concessions.

After all, what are those eternal truths? Are they natural laws, determined and formulated by physics, biology or sociology, and answering to true realities; or conceptions of the human mind, the normative types of thought which you call superrealities, or meta-realities as a theorem of geometry?

DR. PAUL TOPINARD.

PARIS, FRANCE.

LITERARY CORRESPONDENCE.

FRANCE.

I would have many works indeed to call to the attention of the readers of *The Monist* were I to include all the branches of philosophical science. I prefer to confine myself to those whose subject bears a close relation to the philosophy of science and the science of religion.

First of all I will mention among the works on history and criticism, *Platon* by M. Cl. Piat, *Pierre Bayle* by M. Delvolve, and *Leibniz* by M. Baruzi.[1] M. Piat's study is very learned and sensible; that of M. Delvolve very curious and interesting, and not less so is that of M. Baruzi which undertakes to bring out vividly the great views of Leibnitz on the "religious organization of the earth."

The figures of the two philosophers Bayle and Leibnitz are found also in M. Joseph Fabre's *La pensée moderne*, which is the third volume of a series of five whose object is to give us the vast panorama of human thought from antiquity up to the present day. This volume takes us from Luther to Leibnitz.

Descartes, Pascal, Spinoza (and to these are joined Galileo, Bacon, Malebranche, Hobbes, Newton) are shown here in all their glory. M. Fabre has known how to make his analysis briefly, and to present the doctrines skillfully without a tiresome display of erudition. The curiosity of the reader is no less strongly attracted by less familiar figures arranged in their place in the "movements of ideas," where they are given their real significance. Accordingly in books one, five and seven we find discussed the Catholic crisis and the advent of Protestantism, the continued protestation with the dissenters of the seventeenth century, and finally the Puritan reformation with the initiators of the American Revolution. It is enough to speak of the enormous work accomplished by the author and to indicate its value and lofty range.

M. H. Delacroix gives us his painstaking and remarkable studies in his specialty, the history and psychology of mysticism, (*Etudes d'histoire et la psychologie du mysticisme*). The three great types investigated are St. Theresa, Mme. Guyon and Suso with some minor ones, taken in different environments and at different epochs, in order to restore more accurately the elements of which the mystical experience is composed. M. Delacroix does not limit himself to that passive form of mysticism, ecstacy (the treatment here is con-

[1] These volumes and those that follow are published by F. Alcan, Paris.

cerned only with Christian mystics); he rightly shows (and your distinguished compatriot Josiah Moses was wrong in this point) that mysticism in its larger forms reveals itself as active, expansive and creative.

M. Rogues de Fursac relates and describes as an eye-witness the religious revival of the district of Galles (1904 to 1905) under the title, "A Contemporaneous Mystical Movement" (*Un mouvement mystique contemporain*). He writes with sympathy and as an observant spectator. M. Revant d'Allonnes in "The Psychology of a Religion" (*La psychologie d'une religion*) treats from the point of view of the specialist in psychiatry the complex phenomena of revelation and religious inspiration in the personality and work of Guillaume Monod (1800-1896) that "Resurrected Jesus" who has his church and his followers in our modern Paris.

The ethical problem never ceases to occupy the minds of thoughtful people, and this problem which so profoundly engages one's entire life becomes imperative in the present crisis when morality no longer finds a solid foundation upon which to lean outside of the various religions. How different are the points of view from which each person considers the question of morals! M. G. Belot in his "Studies of Positive Ethics" (*Etudes de morale positive*) proves himself to be a sociologist and a utilitarian. M. Fouillée in his *Morale des idées-forces* does not intend to leave technically philosophical ground and flatters himself that he can construct a doctrinal ethics which is convincing. M. Albert Bayet lays his foundation on the idea of good (this is the title of his book, *L'idée de bien*) and conceives as possible a rational ethical art in which science would play a subordinate part. Moreover, he rejects utilitarianism as well as all so-called scientific ethics. The idea of good in his eyes is a relative idea, changing as its object changes, and religious men themselves are compelled to arrive at the conclusion that there can not exist a "universal and holy ethics."

Is it not true on the whole, as I have more than once written here and elsewhere, that we ought not to confound the purely psychological aspect of moral phenomena with their practical aspect? Is it not also true that what we call moral obligation or moral imperative is the result of a psychological impulse as are faith and habit, while duties which are the object of ethics, grow from life itself, that is to say, they are the expression of judgments and feelings in terms of experience? Such in my opinion are the two

essential features of all moral doctrine which can be regarded as positive.

We now come to the bold attempt of M. H. Bergson to apply to biology his concept of "real duration" as distinguished from "abstract time," an expression which sums up the influence of the past on the present and the future. But this expression implies something else in the metaphysics of M. Bergson. It implies liberty, the power of creation, and this is the explanation of the title of the book, "Creative Evolution," (*L'evolution creatrice*). Its final purpose is to take up anew in the light of present-day knowledge the great problem of the origin of life.

M. Bergson's subject leads him to discuss the ideas of finality, chance, non-existence, order, and he does it in pages which are among the best that he has written. I greatly appreciate his shrewd and penetrating criticisms; for instance, that of the principles invoked by the mechanists on the one hand and the finalists on the other. But perhaps he is too complacent in the use of such vague expressions as tendencies, vital enthusiasm, etc., and I find myself in the position of a skeptic, a doubter, after permitting myself to be carried away upon the wings of his metaphors. In the mechanistic theory determinism takes the place of an intelligent God; in finalism a certain force of attraction or repulsion occupies that place. In the "creative evolutionism" of M. Bergson it is activity, and time; it is vital enthusiasm and duration. As contradictory as these leading ideas seem to be and as uneven as their critical efficacy can be, are they not in some respects nevertheless possible substitutes for each other and do they not symbolize a provisional synthesis of the same facts? This difficulty always remains that even if all is not given it nevertheless seems that all can be made with that which is given.

I will refrain from making any further remarks. It is impossible to give in a few lines a satisfactory sketch of a work of such importance.

At the last minute I have just received a work by M. l'abbé Lucien Roure, "Face to Face with the Religious Fact" (*En face du fait religieux*),[2] the title of which alone shows that the author has intended a direct and vigorous work. The religious problem, religious sentiment and its varieties, mysticism and its explanations, religion and life,—such are the subjects treated, and, I will add, treated with eloquence and warmth. In the chapter on varieties of

[2] Paris: Perrin, 1908.

the religious sentiment there are some instructive pages on "immanentism," or the method of immanence recently discussed in France in a talented manner by Father Laberthonnière, but condemned by Rome. The chapters devoted to mysticism are particularly interesting in that they show accurately the point of view of the Catholic Church on this delicate question. I observe that here as in the *Etudes* of M. Delacroix the character of activity is to be found in Christian mystics, among whom the quietists do not hold a legitimate place, according to Abbé Roure. In this connection and with regard to the religious significance of facts without now investigating their psychological definition, the alternative is not imposed upon us to know whether mystical phenomena prove faith or whether it is faith which gives form to mystical phenomena.

This work raises still further questions, but I have reached the limit of this short note.

LUCIEN ARREAT.

PARIS, FRANCE.

DER VORCHRISTLICHE JESUS.*

EXTRACTS FROM A REVIEW BY PROF. DR. KARL BORINSKI.

(Translated from *Xenien*, I., pp. 45-71.)

A book by an American professor of mathematics, which would establish with geometric rigor and precision an entirely new theory of Jesus and the Origins of Christianity, is not thereby, in and of itself, either mathematically or theologically, a phenomenon of interest and importance. Theological mathematicians are in far worse repute than even mathematical theologians. To the latter indeed Kant would seem to have given a final quietus, but the former do yet greatly abound. Alas! it is commonly not the profound martyr-spirit of a Pascal but the cabalistic folly of a Newton, so repellent to the Voltaires and Du Bois Reymonds, that will not let them sleep. In our own time an Italian professor of mathematics has sought to "prove" in a ponderous tome, by a measureless array of figures and formulas, the nonsensical thesis that Dante's Delectable Mountain in the first canto of the Inferno is identical with his Mount of Purgatory. Of the recent American proofs for and against the forbidden fruit of Paradise, the less said, the better....

* William Benjamin Smith, *Der vorchristliche Jesus* nebst weiteren Vorstudien zur Entstehungsgeschichte des Urchristentums. Mit einem Vorwort von Paul Wilhelm Schmiedel. Alfred Toepelmann: Giessen, 1906:

What then is so remarkable in the work of this American mathematician, who emphatically declares to his German correspondent, "my vocation is mathematics, my avocation is theology"?

* * *

There is much, yea, much that is full of significance! Of this we may assure at the outset the reader of this admirable volume. In the first place, our mathematician stands fully abreast with the specialists of his "avocation," being interesting by virtue of his compulsive acumen, and pre-eminent through his wide-extended learning. He strides forth in his critical and theological panoply as sure as if he had never had aught to do except with Bible-texts, Apocryphas, Heretics, Gnostics, Apologists, Rabbinists, and Church-Fathers, had never given a thought to aught else but Semitic languages, the Orient, and cuneiform inscriptions. Only occasionally does an unfamiliar citation from Goethe, or some strong side-light cast on some biologic doctrine, betray the fact that here we have to deal with a theologian that forms a class by himself.

* * *

This it is, the uniqueness of the man much more than the uniqueness of his demonstration, that draws us to him. Leibnitz declares that it is precisely to self-taught scholars that the profession they have conquered owes the most, "for they force their way into the field by a new and hitherto untrodden path, and so catch sight of much that the others, who beat round in the accustomed circle, never became aware of." So, too, our subtile-witted Biblical critic, irrupting from the world of equations into that of text-variants and parables, has perceived that whereof the theological profession as such—now in the sign of Wellhausen, Kautzsch, and Delitzsch—has not so much as dreamed. He has beheld not the traditional "theistic concept of the Yahvist and the Elohist," projected backward nearly three thousand years from the average modern conceptions of Synagogue, Talmud, and Rabbinism. No! Out of unintelligible allusions, divergent text-readings, obscure confessions, rejected witnesses,—a senseless chaotic pall-mall! the inner sense of this transylvanian mathematician, incessantly busied in constructing forms, has beheld ever more and more distinctly a connected text arise and take shape before him. *Voices,* too, have issued forth therefrom, not isolated nor accidental, but *choral strains* other indeed than celebrated the birth of the Christ-child of the Church, and yet at heart no other! *human choruses,* resounding through many gen-

erations and girdling the circummediterranean world with proclamations of the holy household faith of Israel ever more and more affrighted, Israel bowed and finally crushed to earth, but Israel comforted still by his God within, the Lord of his Psalms, and saying, "I know that my Redeemer liveth," and "Behold! He that keepeth Israel shall neither slumber nor sleep."

* * *

This it is, the milder present form of the stern transcendental eschatologic Messiah-idea, not the exalted Messiah-Judge, the Christos of the Hellenistic Jews, but his gentle personal complement, the Jeshuah, Salvation personified, *this* is according to our mathematical clairvoyant the "Nazarean," i. e., not the Man of Nazareth, a place (he assures us) that did not exist at that day, but as the word itself signifies, "the Defender, the Protector, the Guardian." "The term Nazarees, by which the Christians were first known (Acts xxiv. 5), by which they are still known in the Orient, and by which they are denoted in the Talmud, (*Ha-Nôsrîm*, b. Taan, 27b), is common in the Old Testament, where it always means "keeper," "guard" (2 Kings xvii. 9; xviii. 8; Jer. xxxi. 6)." "The root N-S-R. appears 63 times in the Old Testament and never in any other sense." "The attempts of Neubauer, Grätz *et al.*, to find Nazareth in the Talmud, and to identify it with Galilee, have not succeeded." "Epiphanius attests unequivocally that the Nazarees (Ναζαραῖοι, the one form of the name that renders exactly the Hebrew and Syrian Nasarya)" existed before Christ and knew not Christ."...."It is impossible that these pre-Christian Nazarees could have derived their name from Nazareth, with which they stood in no connection. We may be sure that they thought of God as Preserver (N-S-R.)" This word (Nasarya) our author has now found in the great magic papyrus edited by C. Wessely (itself dating from the first half of the fourth century but copied from a very ancient document). It is there used in the exorcism of demons, as we have long known was also the case with the name of Jesus (cf. Heitmüller's *Im namen Jesu*). The invocation of this name at baptism and in magical healings stand thus in line with each other. For Jesus signifies Saviour (cf. Zahn's *Das Evangelium des Matthäus*), just as *N-S-R.* means *Preserver.* Matthew i. 21 proves this "clear as the day": "And thou shalt call his name *Jesus*, for it is he that shall *save* his people from their sins."

To our wielder of equations nothing seems more natural than the combination Jesus Nazaræus, and no less natural that the appellative Jesus (Saviour) as the mightier, holier, *positive* title should supplant the other (Nazaræus), meaning merely "Protector." To us it seems no more wonderful that some—especially Gentiles or foreigners—should attempt to explain this latter epithet as derived from a birthplace than that in the end, through some interpretation or analogy, a birthplace should speedily develop into a resort for pilgrims. How quickly places may acquire sanctity and actually *receive sanction* as being holy, we may see in the example of Lourdes, in which case a few lustra were enough, whereas in the case in hand centuries were at disposal. "This attempt was a quite natural and indispensable part of the one all-embracing process which rounded itself out in the Gospels, namely, the process of historization, of *underpinning ideas with historical details.*"

* * *

Us, however, it behooves to remain conscious, as were those who first spoke and heard the name, of its original ideal significance. "If a conspicuous man were named *Oliver the Protector,* every one would understand this epithet as it is written. It would occur to no one to refer the title to an obscure and otherwise unknown village of Protecteth, or Protecta. Precisely so, if he were named Publius Defensor, no one would ever conjecture that the surname Defensor referred his ancestry back to the unmentioned village of Defenseth or Defensas. Jesus Nazaræus, Jesus the Guardian, is quite parallel with Zeus Xenios, Hermes Psychopompos, Yahveh Sabaoth, and countless others in both classical and Semitic languages."

* * *

A mousing Biblical critic might here start many a question that it would be hard to answer save *in sensu mystico.* As, why did the parents of Jesus (parents in the strict sense according to the Sinaitic Syriac Gospel, the oldest text yet discovered) bear exactly the names of *Joseph* (the patriarch that *delivered* his father and brethren in *Egypt,* that is in Gentiledom, outside of Zion) and of *Miriam,* sister of Moses, witness and mediator of the *deliverance* of the lawgiver of the Nile, *who called his mother as nurse of the Child*? Of precisely that woman who marched as guide along with Moses and Aaron before the Israelites? At the significance of these names and at other considerations (as the *chastity* of Joseph) I shall

here only glance. They are especially important for the needs of Gentile Christians, in the historical outfitting of the Idea. Miriam means beauty, Joseph the *additional* son, (Gen. xxx. 24) or according to Gen. xxx. 23 (though this appears philologically inadmissible), he who hath taken away the shame. And why at his birth do the parents of Jesus go to Bethlehem, literally place of food, of (heavenly) bread—to the "city of David," where lay that field of Boas who there met the foreign gleaner Ruth, soon to become his wife and ancestral mother of David and Jesus, whence too the mighty men of David at peril of their lives brought him the water (of life) when the Philistines had beset the place (2 Sam. xxiii. 13-17)?

* * *

The orthodoxy of a spiritually elevated humanity will some day find its confirmation in such "facts" as these, which indeed have always afforded the Bible reader, illumined by the "Holy Spirit," his last refuge from internal doubt and contradiction, from external strife and attack. Even now the *positive* criticism of our author directs the attention of Orthodoxy to a most important fundamental consideration: "We recognize now clearly the open secret of the triumph of Athanasius and of the foredoomed failure of Arianism as well in its ancient as in its modern forms" (as Socianism or the "Germanism" of Herr Chamberlain).—The loftiest spirits of the ancient Church, as Augustine in his *Confessions* (VII, 19, on gross misconceptions of the Incarnation) have always found the solution of this enigma only in a strict dogmatic, never in an historical, interpretation. "Jehovah and Messiah" are exchangeable ideas that can never be parted asunder by pragmatic distinctions. How did it come to pass that precisely the most radical assailants of the Christ "after the flesh" in the first real battle for dogma, that precisely Marcellus and Photinus, were out-and-out Athanasians? Herewith too a strange light is shed upon the doctrine of Apollinaris, that the Incarnation of Christ is accomplished only *in the believer*, and the merely *practical* rejoinder of Athanasius and Gregory Nazianzen, that hereto a divine *model was needed*! In this light Nestorius, who first attacked the idea of the "Mother of God," appears as a rigorously orthodox heresy-hater.

* * *

See how our author lays bare the very root of the matter: "No matter by what transcendent abilities conducted, no matter by what learning and logic and devoted zeal, the attempt to deduce Christian-

ity from a man, no matter how magnified, must prove forever abortive. For the Jesus Christ of primitive Christianity was not human but Divine, the King of Kings, the Lord of Lords, the Saviour, the Deliverer, the Guardian-God."

* * *

From this orthodox point of view our uncompromising mathematician proceeds straightway to inquire into the primitive sense of the preaching of the Anastasis, "God hath raised up Jesus." His starting-point is the remarkable discussion (by the disciples) of the significance of this promised Resurrection: "What is it, to arise (from the dead)?'" (Mark ix. 10).

Long ago Spinoza (in his twenty-third letter to Oldenburg) advanced a purely spiritual interpretation of this "Resurrection from the dead," aligning it with "Let the dead bury their dead." But our author is at once more definite and more radical. For him the original apostolic reference was to the *Installation as Son*, the determination to Sonship, as written in the second Psalm: "Thou art my Son, this day have I begotten thee." The passage in Acts (xiii. 23f), which teaches the upraising of Jesus with express reference to this Psalm, is so very important because it discovers the *original idea and* the process of transformation to a wholly different meaning. Paul's sermon on Mars' Hill was so exclusively a "Gospel of Jesus and Anastasis" (Acts xvii. 18) that the sensation-loving Athenians understood it outright as the introduction of two "new Gods." The meaning of this primitive preaching of the Upraising is given in the Psalm: It is the inauguration of the Son-of-Man as the *active Representative* Godhead. This Son-of-Man was an over-earthly being, vicegerent of the highest Godhead, who receives an "eternal dominion and indestructible kingdom" (Dan. vii. 14). In the doctrine of the Naassenes (highly enlightened pre-Christian Gnostics) this Son-of-Man (Barnasha) signifies human being, almost abstract *Humanity*. "This kingdom" (says our author) "actually embraced all peoples, tribes and tongues, and was so far forth an earthly kingdom; but it was handed over in Heaven by and before the "Ancient of Days" and so was a kingdom of Heaven, even as its king was a citizen of Heaven." The establishment of this kingdom of Heaven (Malkuth Schamajim) on earth was originally conceived as that precious fragment of a purely human apocalypse paints it, as a kingdom of the righteous and the loving (Matt. xxv. 31-46; cf. Dan. xii: 1-4).

It was entirely in this Old Testament sense of the advent of Judgment at the hands of Michael as a kind of Vice-Jehovah (Dan. xii), or of Messias-Christus as Son-of-Man, that we find the kingdom of the skies proclaimed by the Baptist. But mark well a new and weighty observation! In the Gospel narrative it is plain to see that "the Baptist *did not himself at first proclaim* the Jesus." In Matt. xi. 2-6 and Luke vii. 18-23 we read: "Art thou the Coming One or look we for another?" The imprisoned John sends this question to the Jesus who had just appeared on the scene with an independent proclamation; says our author: "Here we behold the *confluence of two streams of religious thought*—The Gospel of the coming One and the Gospel of the Jesus, henceforth to mingle their waters forever. The first seems to have been almost pure Judaism, in fact perhaps Palestinian Judaism, that took its rise from Daniel and went not far beyond the current apocalyptic Messianism. The second seems to have been born in the Dispersion and was at first only half-Jewish and half-Hellenic or -heathen. As such it must have scandalized the strict orthodoxy of Palestine, the temple, the Sanhedrin, and while attracting a few must all the more have made the majority stumble. Such seems to be the meaning of the words of the Jesus: "Blessed is he whosoever is not scandalized *in me*." Verily these words also were prepared prophetically as a "stone of stumbling and rock of offense."

* * *

Jesus comes "out of Galilee" for the (Jewish) baptism of John, "out of the Galilee of the heathen" of Isaiah! In the darkness, in the region and shadow of death it was that the great light long prophesied arose (Matt. iv. 12-16). The Baptist at first knows not this Jesus (John i. 31). His "going into the Judean land seems to shadow forth the gradual progress of the Jesus-cult from the Dispersion into the orthodox Jewry." John the Baptist rejoices thereat. "He must increase, I must decrease. He that comes from above is over all" (John i. 30-32). Thus interprets our author: "Here seems to be set forth the gradual exaltation of the Jesus-idea over the idea of the Coming One. Certainly an antagonism between the two ideas is here cautiously disclosed. . . . There is no choice left us but to recognize the two great concepts of the Coming One (the Christ-Messiah) and of the Jesus as primarily distinct but finally fused into one, the world-conquering concept of the Jesus-Christ."

How different they were has already been stated in these terms at the close of the first essay, on the pre-Christian Jesus: "Moreover since the Jesus is called *Kurios* (Lord), the regular if not quite universal Septuagint rendering of the divine name JHVH, it is evident that the Jesus was from the start nothing else than a divinity, in fact God himself, but regarded *under a definite aspect, as a peculiar Person*, namely, as the *Deliverer*, the *Defender*, the *Saviour*; Christus (strictly Chrestus) denotes the *same Deity* under a *somewhat different aspect*, namely, as *Messiah, King, and Judge*.

The Mightier, who in the preaching of the Baptist should come, was none other than God himself as prophesied in Malachi iii. 1; iv. 1, 5. It was the *Union of these two points of view*, of the *gentler Jesus* and the *sterner Christ*, that yielded *Jesus the Christ, the Lord God of the Oldest Christianity*. The proclamation of this Union was the slogan of the primitive preaching."

* * *

That the Parables, the especial flower of New Testament poesy, the "convincing proof of its inspiration" (Jülicher), have in the process of the suns taken on other colors and indeed other forms than the original, our author is at pains to show in his fourth essay. "The Sower sows the Logos" *not* (he maintains) in the ethic-symbolic sense of the word of Salvation, of *conversion* to the kingdom of God. Nay, it is *God the Creator* who in his own person as Sower sows (in allegory) the divine Logos as *Seed-of-Men* upon the field of the world and beholds what fruit it bears. This is the doctrine of "cosmic seed," or, as we would say, of the "inner forms" of things, which Anaxagoras grounded and the Stoics developed into their doctrine of the *spermatic Logos*, the ideal seed of the World. According to Plotinus (*En.* IV, 3, 10, 380) the germinal Logoi form and fashion organisms like "microcosms." The spermatic Logos, observes our author, well versed in modern as in ancient lore, plays with Plotinus almost the rôle of the continuous germ-plasma of Weismann. The Jew Philo operates with this conception of the spermatic Logos as with a matter needing no explanation (*de. virt.* II, 533f). Among other Jews Justin in his so-called second Apology and James in his Epistle (i. 21) are cited to show how universally current in the Dispersion was this stoical notion of the Logos implanted in man. For "aside from two or three lines plainly interpolated, this Epistle knows nothing of historical Christianity. James is speaking of the ethical doctrine of the Dispersion."

Smith calls this original strictly allegorical version of the Parable the *Naassenic* version. On p. 118 he sketches with the hand of a master in philology how we are to conceive this primitive form.

These Naassenes, treated at length by Hippolytus, formed a pre-Christian sect which, so far from *perverting* the Gospel of the Cross, have preserved intact certain aboriginal types of Christianity. From them have been derived all later forms of Gnosticism. The Naassenic hymn quoted by Hippolytus celebrating the help of Jesus descending from the bosom of the Father to battle with the ills of the world, our author esteems not merely archaic, as do Harnack and Preuschen, but as preceding the Christian Scriptures and even the Christian era.

* * *

Herewith, in his last essay, *"Sæculi Silentium:—the Epistle to Romans before A. D. 160,"* the author enters upon a more strictly historic field of investigation. Thus far he has dealt with the ideas themselves that determined pre-Christian Christianity rather than with the historic phenomenon and its documents. To be sure, the axe that is here laid at the tabu of New Testament criticism (the Pauline Epistles), threatens also at the same time their peculiar tendence, that "Pauline Christianity," so called with visibly increasing reluctance. But this daring path-breaker has already indicated that herewith he will merely pave the way to an illumination of the dark-hidden core of Christianity, the Life and Crucifixion of Jesus. The ignorance and uncertainty concerning the beginnings of Christianity, so keenly felt even in apostolic times, find their explanation in the fact "that the doctrine of the Jesus was pre-Christian, a cult which, on the border of the centuries (from 100 B. C. to 100 A. D.), was wide-spread among the Jews, and especially the Hellenists, being more or less veiled in "Mysteries." Not even a far keener-sighted explorer than any evangelist could have spied out and unearthed the origin of such a deep- and wide-rooted growth."

* * *

Here too the Alexandrine Jew of Acts (xviii. 24-28) serves our author as capital witness, Apollos, "An eloquent man and mighty in the Scriptures." This fiery spirit "was wont to preach and teach accurately the doctrine of the Jesus (*τὰ περὶ τοῦ Ἰησοῦ*) *although he knew only the baptism of John.*" This singular character, already instructed as a "catechumen" in historical Christianity, of whose supposed definitive fundamental fact, crying aloud to heaven, he yet

[illegible] at the opening of the [illegible] "twelve disciples"—a canonic [illegible]—whom Paul met in Ephesus, who knew not that there [illegible] who also had been baptized only with John's [illegible] "believers." Yea, even in the self-[illegible] of Antioch we meet with so-called [illegible] that Christ had been a man of flesh and blood. [illegible] considerations, such as the silence of [illegible], the mutual annulment of Matthew and Luke in their accounts of the Nativity,—*all* [illegible] compared with "the very serious riddle [illegible] New Testament." How explain the [illegible] contradiction between the primitive *preaching* [illegible] immediately imminent lightninglike and [illegible] catastrophe, and the *teaching of the Kingdom* [illegible] and spiritual development, proceeding step by step [illegible] as the sprouting of the mustard seed or the [illegible] Compare Matt. xxiv. 27 with Matt. [illegible] Not Baur, the head of the critical [illegible] the first discovery of this contradiction is ascribed. [illegible] Lessing's Wolfenbütteler Fragmentist, H. S. Reimarus, was the first to "find in this thoroughgoing contradiction the proper [illegible]" and in fact almost in our author's own words. Baur's two-term formula of Paulinism *vs.* Petrinism has long since ceased to satisfy. Of "ingenious" interpretations of the "Self-consciousness of Jesus" in this radical contradiction between his preaching and his teaching, our author will have none. He [illegible] of the [illegible] *setting of the whole process itself*. He [illegible] the fact of that contradiction "as only one among many similar phenomena of a *transformation of the propaganda*."

And it is on this threshold that we look forward to the promised continuation of our author's researches in such a well-ransacked region, indeed, with intense expectation. In this remarkable investigator, with all his radicalism, there breathes no breath of destructive zeal, but rather through and through, a *constructive and requickening criticism*. Will he be able to reproduce for us the historical picture of the great national-spiritual tragedy of the Destruction of the second Temple?*

* It may perhaps interest the reader to learn that Prof. Smith has assembled and hopes ere long to publish a large body of evidential matter bearing on this and related questions. Professor Borinski's own interesting interpretations are here omitted as only indirectly related to the subject of the review.

Investigations like the foregoing furnish clear proof that there is no better antidote for the much decried "destructive" tendencies of Biblical criticism than its own self: than resolutely to follow out its most delicate and "dangerous" researches and reasonings to the very end. For thus, instead of a timorous policy of barricade, behold the ancient truth revealed clear and pure, no longer indeed blinding, because now perceived with the well-armed eyes of science, but all the more overmastering. For Truth stands never in conflict with Truth, and the Holy Spirit loses naught in power or dignity, whether it find expression in the life of an individual or in the firmly compacted intuition of an age and a race. Neither is the validity of the Biblical text for the churches hereby affected, whatever attitude they may assume regarding it. Is there not indeed far greater cause of uneasiness in the perpetual strife of dogmas, each denying the other and denouncing it as heretical? Is it not this very strife that has brought us to our present unbearable condition? Nay more, it is the eternal wrangle of the churches that has set Faith hopeless and helpless at war with herself, and it is precisely from such researches as the foregoing, which dispel doubts and annul contradictions, that the *Faith* of the best of every creed may hope to win security and unity once more. And if any man chooses to dub the result "docetic," because forsooth teaching that the history of Jesus is a fact not of history but of *Faith*, by all means let him have his word. In the spirit of real religion it is a title of honor. For was not Docetism the oldest, the *actually historic*, view of the story of Jesus? And is not this form of faith in that story the only one that can lend it virtue? It is only in presence of this genuine Faith in the Eternal Son of God, revealed in Righteousness and Love, and not in the presence of legends, miracles, and relics, that invincible Science is awed and lays down her weapons.

THE THEORY OF A PRE-CHRISTIAN CULT OF JESUS.

Prof. W. Benjamin Smith's collection of essays in German[1] on the origin of Christianity—which is sufficiently paradoxical in the circumstances of its publication, since it is the work of a distinguished American writer on mathematics—employs no small learning in the defence of a theory that is a still greater paradox. No

[1] *Der vorchristliche Jesus, nebst weiteren Vorstudien zur Entstehungsgeschichte des Urchristentums.* Mit einem Vorworte von P. W. Schmiedel. Giessen: A. Zöpelmann, 1906.

historical hypothesis put forward by any competent scholar was ever more revolutionary, or more important, if true. For, while it is certain to seem startling, beyond any other possible hypothesis, to religious orthodoxy and critical conservatism, it is equally at variance with the fundamental presuppositions of the whole advanced school of New Testament criticism. Yet the argument is so skilfully handled, and so much apparent new evidence is extracted from familiar data, that one of the most eminent and most radical of the critics of the prevailing school commends the book, in a friendly preface, to the serious consideration of the Biblical scholars of Germany, and, while certainly not professing conversion, declares that the reasoning is "really by no means so easy to refute."

What we know as primitive Christianity, Dr. Smith contends, was the product of a vast and slow syncretism. The more fundamental and distinctive elements in it were derived from Gnosticism—of which movement, therefore, it was the child, and not, as has been supposed, the parent. The Christian faith of the second century emerged, through certain processes of fusion and modification, out of the doctrines of quasi-Gnostic sects that flourished in Syria at least a generation before the Christian era. The name of its reputed founder, Jesus Nazoræus, was originally that of a divine being or Aeon reverenced by the sect of the Naassenes,—and probably by others. The semi-human figure who is the hero of the Synoptic Gospels was evolved (chiefly as the result of the partial transformation of this Gnostic theosophy through its merging with Jewish Messianism) out of the celestial object of this primitive Jesus-cult. The resurrection-belief originated in a sort of etymological myth, due to the ambiguity of such words as *ἀνίστημι*, *ἀνάστασις*, *ἐγείρω*; the doctrine of 'the raising-up of the Christ' at first related, not to the reappearance of a body once entombed, but to the divine legation and the final triumph of the heaven-descended Messiah. The ethical and religious content of the extant Gospels consists, not of the utterance of a great Teacher more or less diluted and corrupted by the inferior media through which they are transmitted, but of the ultimate deposit of the reflection and discussion of several generations of men profoundly stirred by one form of that movement of mysticism, otherworldliness and aspiration after inner regeneration, which was then sweeping over the entire Hellenistic world. The literary excellence and the moral profundity of many of the sayings and parables in the Gospels is the result, not of the

inspiration of a single Master, but of the long social attrition through which they were sharpened and polished, and of the gradual process of spiritual selection of which they are the fit survivors. All of this Dr. Smith believes to be capable of proof. And, though further evidence is promised in subsequent publications, the substance of the proof to be offered seems to have been already exhibited chiefly in *Der vorchristliche Jesus*.[2]

There is, or ought to be, no *chose jugée* in history; and the present theory, revolutionary though it is, deserves—since it undeniably has extensive erudition behind it—to receive an unprejudiced and careful examination. Fortunately the main argument is reducible to a few clear and definite contentions. I shall try to state these in consecutive order; to indicate the principal evidence offered for each; and to give an opinion concerning the genuineness and adequacy of that evidence.

I. It is undeniable, Dr. Smith maintains, that sects adhering to a characteristically Gnostic type of doctrines and 'mysteries' flourished widely in the Hellenistic world during the first century B. C. and at the period of the diffusion of Christianity; and, by the showing of the canonical writings themselves, such sects looked upon the Christian teaching as akin to their own.—The argument for this preliminary generalization rests chiefly upon the case of Simon Magus (Acts viii. 9-24, supplemented by Justin, *Apol.* I, 26 and 56: Irenæus, *c. Haeres.* I, 22; II, 126; IV, 6). If we take the passage in Acts as the reflection—distorted under the influences of very obvious motives—of a historic character and a real situation, and if we identify this first-century Simon with the originator of the Simonian heresies described by Justin and Irenæus, we get a representation of an immensely influential leader who owed nothing to Christian teaching and whose propaganda began earlier than that of Christianity; who was no mere sorcerer, but the preacher of a universal religion based upon a philosophical monotheism combined with Gnostic dualism and emanationism; who was deified by his followers; whose own traditional attitude towards Christianity was friendly enough; whose followers were, in the early second century, not generally distinguished from the Christians; and whom patristic tradition regarded as the father of all the Gnostic heresies. The assumptions upon which this representation is based seem to me

[2] For the reader of English only, a first-hand account of Dr. Smith's hypotheses seems to be available only in his article "New Testament Criticism" in the *Encyclopedia Americana*. A part of the argument is, however, published in *The Monist*, XV, pp. 25-45.

fairly probable ones. But the fact remains that the Simon-legend constitutes a historical conundrum of an almost insoluble complexity. There were, as Schmiedel has pointed out, at least four figures of Simon, one of them being apparently the Apostle Paul (*Enc. Bib., s. v.*); it is impossible to affirm, with any considerable degree of confidence, just where one of these figures ends and another begins. The whole matter is involved in the controversies over the authenticity and date of the Pauline Epistles; the sources and date of the Book of Acts; the date and sources of the *Clementina*; the respective characteristics and the precise relations of Petrine and Pauline Christianity. Dr. Smith can hardly be said to have settled all these related issues; and for the present, therefore, any argument founded upon the passages relating to Simon Magus must be regarded as somewhat less than conclusive. For all that it may be considered a reasonable probability, to which facts of several sorts point, that tendencies or organized sects characterized by some or most of the distinguishing elements of Gnosticism, and especially by a fusion of Jewish, Greek and Persian ideas, were not rare about the beginning of the Christian era; and that Christianity was only one example of a common type of innovating religious movement at this period.

II. The great point of Dr. Smith's argument, however, lies in the assertion that the name Ἰησοῦς ὁ Ναζωραῖος is to be found as that of a Logos or divine emanation among one or more quasi-Gnostic sects of unmistakably pre-Christian date.—In point of fact, no example is offered of the employment of the two words in conjunction anywhere outside of the New Testament. It will therefore be advisable to consider the evidence concerning each of the two terms separately.

A. *The name* Ἰησοῦς. 1. The proof of the existence of a Gnostic Jesus-cult in the first century B. C., Dr. Smith finds, first and foremost, in a passage of the *Refutatio* of Hippolytus. There we are told (V, 6) that the sect of the Naassenes adored as the primary manifestation of the ineffable Deity an archetypal, celestial Man, whom they also spoke of as "Son of Man"; and in a Naassene hymn cited by Hippolytus (V, 10) the name Jesus occurs as that of a pre-existent heavenly being sent by the Father to the lower world as the imparter of the saving Gnosis to suffering humanity. Now, we have good reason to believe, argues Dr. Smith, that these Naassenes were pre-Christian. For Hippolytus's arrangement of the heresies is plainly meant to follow a chronological order. And

it is the Naassenes that he mentions first of all; they, the Peratae, the Sethians and Justin, all come before Simon Magus, whom tradition represents as an older contemporary of the Apostles and the father of all the heresies. Hippolytus, according to our author (p. 123), "declares repeatedly that the Naassenes were the first of the heretical sects, from whom all the others afterwards known as Gnostics derived (*Ref.* V, 6, 10, 11)." "We may quite definitely conclude, therefore, in agreement with Hippolytus, that Naassenism was antecedent to Christianity, that it flourished before the Cross was preached, and that the later forms of Gnosticism were its offspring" (p. 124).

If the reader will now turn to Hippolytus* and examine the fifth book of the *Refutatio* for himself, he will be likely to revert upon these last-quoted sentences with some astonishment. For he will discover two things. First, Hippolytus in none of the passages cited makes any such statement as that ascribed to him, about the descent of all other Gnostic doctrines from Naassenism. The nearest he comes to it is to say that the Naassenes "afterwards called themselves Gnostics" (which does not imply that they were the only or the first heretics who did so, and that "separating from them, many devised a heresy, in appearance manifold, but in reality one" (V, 6); this last seems to refer merely to the diverse subdivisions of the Ophite sect. Second, Hippolytus in plain terms describes the Naassenes as Christians. They are classified as a "heresy"; they taught that the archetypal Man "descended in one man, Jesus, who was born of Mary" (V, 6); they traced their doctrine "through Mariamne to James, the brother of the Lord"—which, of course, shows them not only Christian but also, at earliest, of the first or second generation *after* the Apostles. Dr. Smith's omission to mention any of these statements of Hippolytus, and his citing of that authority as a witness in favor of a view of the date of the Naassenes which the very same chapters of the *Refutatio* categorically contradict—this is a thing so amazing that it is difficult to comment upon it with propriety. Perhaps the author proposes to begin his argument by striking out from Hippolytus's text all the numerous passages unfavorable to the theory of a pre-Christian Jesus. But nothing is said even of such a desperate way of dealing

* Having seen advance proofs of Professor Lovejoy's criticism, Dr. Smith takes exception to the implication of unfairness on his part in the citation of Hippolytus, and in the January number of *The Monist* will take the opportunity to maintain his position especially with regard to this point as well as other particulars presented by Professor Lovejoy.—Ed.

with the difficulty. The unsuspecting reader is simply given to understand that Hippolytus plainly and consistently describes the Naassenes as pre-Christian; in point of fact, he plainly and consistently describes them as a late first-century or second-century Christian school. In view of this, Dr. Smith's long essay on the Parable of the Sower must also be considered a failure. It is designed to show that the parable is a reworking of a Gnostic cosmogonic myth, relating the Creator's dissemination of the λόγος σπερματικός among the different classes—pneumatic, psychic, choïc—of mankind. The idea is not without intrinsic plausibility; but the argument for it rests entirely upon the assumption of the pre-Christian date of the Naassene version of the parable, given by Hippolytus. And this assumption Hippolytus himself expressly forbids.

It is, indeed, true that there is some (though little good) patristic evidence for the non-Christian—not the pre-Christian—character of the Naassene sect. "Naassenes" is, of course, only Grecized Hebrew for "Ophites" or "Serpentists"; and of the Ophites Origen avers (*c. Cels.* VI, 28—the passage is not noted by our author) that "they spoke against Jesus....and would not so much as listen to the name of Jesus," (which, of course, proves too much for Dr. Smith's case). But this is flatly contradicted by Epiphanius (*Adv. Haeres.* 37), by Irenæus (I, 34); and by Jerome (*Adv. Lucif.*, 23), all better authorities than Origen on heresiology. It is not impossible that there was a pre-Christian Ophism, under a Hebrew name; but there is no real evidence of its existence. And there is not the least reason for believing (even if such a hypothetical pre-Christian stage of Naassenism be assumed) that in such a stage the sect knew anything of the name "Jesus." For the only Naassenes of whom Hippolytus has anything to say were definitely Christian.

2. The author also adduces in favor of his theory the fact of the occurrence, in an "old" passage of the Paris Magic Papyrus, of the words: "I adjure thee by the god of the Hebrews, Jesus" (ed. Wessely, l. 3120). If, as some authorities suggest, the passage be pre-Christian, it is undoubtedly significant. But so long as the date of it remains essentially conjectural, no argument of any weight can be rested upon it.

3. In the New Testament itself, however, Dr. Smith finds evidence pointing toward his conclusion. In Acts xviii. 25 we are told of Apollos of Alexandria that, coming to teach in Ephesus, "he

was wont to speak and teach accurately the doctrine of Jesus (τὰ περὶ τοῦ Ἰησοῦ)," though "knowing only the baptism of John." One who "knew only the baptism of John," argues Dr. Smith, can hardly have had any contact with the Christian propaganda. Whence, then, his knowledge of "Jesus"—unless there existed, independently of the Christian Church, and before it, a Gnostic Jesus cult, of which Apollos was one of the itinerant preachers? The argument has a certain *prima facie* effectiveness; but Dr. Smith again shows a surprising facility of forgetting the context of his chosen evidential passages. There are two considerations which prevent the story about Apollos from serving our theorist's purpose so well as it at first appears to do. The essential point of that story, as conceived by the author of Acts, is clear. The conception of the Holy Spirit, and the doctrines of the power of the Apostles to impart it, and of its wonder-working presence in the Church, may be said to be theological hobbies with that writer. Now "the baptism of John" (in contrast with the orthodox apostolic baptism) had come to be almost a technical term, signifying a "baptism of repentance" merely in which there was no reference to the Holy Spirit and no impartation of it (cf. Acts, i. 15; xi. 6; viii. 16, 17; Matt. iii. 11; Mark i. 8; Luke iii. 16; John i. 33). And (as is clear from the immediately following passage, Acts xix. 1-6) the fact that the disciples of Apollos had been baptized "into John's baptism," was taken as synonymous with the fact that they "had not so much as learned whether there is a Holy Ghost." Paul thereupon administers the joint ceremonies of baptism and laying on of hands, and "the Holy Ghost came upon them, and they spake with tongues and prophesied." Now, it is not only possible, but even probable, that there existed early communities of Christians to whom the (probably not primitive) doctrine of the Holy Ghost, and the tale of the marvels of Pentecost, needed to be taught; and in the Apollos-story we very likely have the traces of some such episode. Certainly such an explanation of it seems far more natural than Dr. Smith's, while it is equally adequate to account for the peculiarities of the incident recorded. It is, indeed, true (for the second consideration) that we are told that Paul baptized these disciples of Apollos "into the name of the Lord Jesus." This might (though it need not absolutely) imply that they had not before been baptized in that name. Such an interpretation would undoubtedly make the whole character of the doctrine and affiliations of Apollos rather obscure. There seems to be an inexplicable inconsistency between what is asserted

by xviii. 25 and what is suggested by xix. 4, 5. But if the author of Acts really intended to indicate that the disciples of Apollos had not been baptized in the name of Jesus, his testimony would be even more unfavorable to Dr. Smith's hypothesis than it is upon the other interpretation. For if, as Dr. Smith believes, Apollos's whole teaching centered about the "name" and the powers of a divine emanation called Jesus, and if (as the text affirms) Apollos observed the rite of baptism, it would be inconceivable that he should not have baptized his followers "into the name" of that divinity.

B. The term Ναζωραῖος. For the pre-Christian use of this term Dr. Smith seems to me to make out a not much better case. His principal arguments are these:

1. As every one knows, the traditional explanation of this adjective as derived from the name of a Galilean town has long been unsatisfactory. We have very good reason for disbelieving that, in the first century, any such town existed.[1] Dr. Smith reviews the various theories that have been devised for dealing with this difficulty and finds all of them—even Cheyne's equation of "Nazareth" with Galilee—open to reasonable objections. Yet the word, for some reason, played a great part in early Christian nomenclature. Epiphanius says (*Adv. Haeres.* 29, 1) that the followers of Jesus were all called Nazoræans before they were known as Christians. The name persisted as that of a Judæo-Christian sect who acknowledged the Messiahship of Jesus, but insisted upon the observance of all the requirements of the Law.

2. It is etymologically possible to derive the word from נָצַר, "to guard, preserve"; "Jesus Nazoræus" would then mean "Jesus the Preserver" or "Saviour." If this were the title of a divinity worshipped by Gnostic sects out of which Christianity developed, the early emphasis upon the epithet would be naturally accounted for; while neither the title itself, nor the emphasis on it, can be made intelligible upon the supposition of its reference to a wholly obscure, and probably non-existent, town.

3. Epiphanius speaks (*op. cit.*, 29, 6) of Ναασαραίοι who "were before Christ and knew not Christ." This seems pretty direct evidence that the word was in use with some special religious significance in the pre-Christian period.

This evidence, also, does not appear conclusive; but it has pertinency and interest, so far as it goes. It may be that Dr. Smith has here hit upon a hypothesis that may eventually yield fruit. Yet

[1] See Dr. Smith's article in *The Monist*, XV, pp. 25-45.

even here he overstates the testimony of his sources, especially in his treatment of the evidence of Epiphanius, which he regards as so "conclusive" as to be "in fact the end of controversy."[4] Epiphanius, in the first place, expressly distinguishes the terms "Nazoraioi" and "Nasaraioi," and plainly differentiates the sects to whom he ascribes those names. The "Nazoraioi" were a Jewish-Christian or Ebionitish sect, well known to us from the references to them by Jerome and other writers, as well as from the description of Epiphanius. They "adhered to the Law and practised circumcision," they "did not renounce the Law and the Prophets," but "confessed all things exactly as do the Jews," "differing from them only in believing on the Christ" (Epiphanius, *Adv. Haeres.* 29).[5] The "Nasaraioi," on the other hand, according to the Bishop of Constantia, were a pre-Christian sect, Jewish by race, and classified by him among the "Jewish heresies"; while they observed the rite of circumcision, the Sabbath and the Jewish feasts, they condemned sacrifices, ate no flesh, and rejected the Pentateuch, professing to be in possession of a more authentic Mosaic revelation. If the Christian "Nazoraioi" and the pre-Christian "Nasaraioi" were, as Dr. Smith contends, one and the same sect, it is curious that the vegetarian regimen and the hostility to the orthodox Law, distinctive of the latter "heretics," were not found among the former also. Moreover, the "Nasaraioi" are the peculiar property of Epiphanius; apparently no other patristic writer gives even a hint of their existence. His own information about them he presents as having come to him rather vaguely at second-hand (ὡς ὁ εἰς ἡμᾶς ἐλθὼν περιέχει λόγος). Now a fact so significant as the derivation of Christianity and of the original name of the Christian believers from so peculiar a Jewish movement, could not have been unknown to other apologists and heresiographers. But Dr. Smith supposes that all save Epiphanius suppressed their knowledge, because the fact ran counter to the theory which they wished to establish, about the origination of the Church in the work of a personal Messianic founder. The "Nasaraioi" were never to be mentioned, lest the whole fatal story of the true descent of Christianity—now first revealed by a mathematician of New Orleans—should be given away. The supposition is far from plausible. A conspiracy of silence so extensive and effectual, about a fact that (according to the hypothesis) must at

[4] *The Monist*, XV, p. 34.

[5] So Jerome: ita Christum recipiunt ut observationes legis veteris non omittant.

the outset have been notorious and undeniable, would be a truly miraculous violation of historical probability. There is no reason to think that the early Christian writers had the wit to conceal so completely the skeleton in their closet, even if they can be supposed to have been, for some centuries, unanimous in a deliberate design to do so. Nor could such mere evasion have been a natural or effective policy for them. For their opponents, pagan and Jewish, must have known the fact as well as they; and one can well imagine how constantly (under the supposed circumstances) the name "Nasaraioi" would have been thrown into the faces of the Christians, and how imperative it would have been for the apologists to discuss directly, and to explain away, the connection of their Church and doctrine with this (*ex hypothesi*) familiar school of heterodox pre-Christian Jews.* Out of a single description of a sect of "Nasaraioi" by a late fourth-century writer of not the highest authority, who confessedly knew nothing about them at first-hand, Dr. Smith fabricates a whole chapter of church history that is in the highest degree picturesque and engaging, but quite impossible of belief. The solitary testimony of Epiphanius—in view of the countervailing probabilities—is quite insufficient to assure us that there ever were any such "Nasaraioi" as he describes. He was capable of a great amount of confusion of names and of misapprehension of facts. But assuming that the sect existed as described, the antecedent probabilities concur with Epiphanius's own account of the matter, which is that the pre-Christian "Nasaraioi" and the "Nazoraioi," or early Jewish Christians, were quite distinct bodies, with different tenets and customs, with conflicting attitudes toward the Pentateuchal Law, and, indeed, with little in common beyond a similarity of names. Finally—and this is perhaps the greatest gap in the argument—Dr. Smith entirely fails to bring his pre-Christian Nasaræans or Nazoræans into any sort of relation to a Jesus-cult. The two halves of his principal argument fail to connect. "Nazarene" may possibly enough have originally been an epithet having some religious rather than geographical import; though we do not know what that import was, and the whole question is merely a field for ingenious and

*Lest the reader suspect me of exaggeration in ascribing to Dr. Smith this humorous idea of a conspiracy of silence about the "Nasaraioi," let me quote his own words: "The dumbness of other heresiologists....now becomes more expressive than their speech. It was just because they had wit enough to perceive the danger of discussing these Nasaraioi, that they maintained a prudent but ominous silence, broken only by harmless allusions to their heretical doctrines. But the valor of Epiphanius got the better of his discretion." *The Monist*, XV, p. 41.

unverifiable conjecture. But at all events, the first-century Jewish community who (according to Dr. Smith) had the name of Nazoreans, are not said, even by Epiphanius, to have maintained a cult of a divine being called Jesus; and the sect which did (according to Dr. Smith) maintain such a cult was not called Nazorean. We are still a long way from the beginning of a proof of the existence of a Gnostic pre-Christian cult of Ἰησοῦς ὁ Ναζωραῖος.

III. The words ἀνίστημι and ἀνάστασις, with their Aramaic counterparts, were—so the next argument runs—quasi-technical terms in the vocabulary of Jewish Messianism; they referred to the coming and triumph of the hoped-for Redeemer of Israel or of mankind; and the first preachers of the "Anastasis of the Christ" could only only have been understood by their contemporary hearers as heralding the speedy fulfilment of this hope.—This contention Dr. Smith bases chiefly upon two sorts of evidence.

1. An examination of both the classical and Hellenistic use of ἀνίστημι, he maintains, shows that, when not qualified by other expressions, the word did not ordinarily or naturally suggest the idea of resurrection from the dead; while it was very familiar in the sense of the "raising up" or "bringing forward," through providential agency, of a prophet or leader or king or deliverer or "horn of salvation." The latter use unquestionably occurs in the New Testament, e. g., Acts iii. 22, 26; Heb. vii. 11. But the other meaning is, of course, far more common; and I can see no reason whatever for supposing it to be a later or secondary meaning. The verb is used—and used without ἐκ νεκρῶν or other explanatory context—with the sense "to restore to life," in what was very nearly the most famous passage in all Greek literature—the speech of Achilles to Priam in the last book of the Iliad (550-551):

> "οὐ γάρ τι πρήξεις ἀκαχήμενος υἱος ἑῆος,
> οὐδέ μιν ἀνστήσεις."
>
> "For naught shall it avail thee to mourn thy noble son.
> Thou canst not raise him."

The same sense occurs again in a familiar choral ode of the Agamemnon of Æschylus (1361), and the Electra of Sophocles (139). Dr. Smith assuredly knows these facts; he would, I think, have dealt more fairly with his readers if he had explicitly mentioned them—at least the Homeric instance—especially since he takes the trouble to explain away the significance of Lucian's use of ἀνάστασις, in the sense of "resurrection from the dead," on the ground of the

late date of the writer. This substantive, it is evident, must always have been capable of suggesting the same range of meanings as the corresponding verb. As for the Hebrew terms, the author's discussion of them is no more convincing. It is true that the causative (Hiphil) of קוּם, "rise," does not occur in the Old Testament with the meaning "raise from the dead"; but the active form of the stem is used to signify "to rise from the dead" in Isaiah xxvi. 14, and Job, xiv. 12. These pertinent passages our author likewise neglects to quote. Dr. Smith's sixteen pages of labored reasoning on linguistic grounds seem to me wholly without valuable result.

2. A simpler piece of evidence, however, is found by the author in 2 Timothy ii. 18, where we are told that certain teachers, Hymenæus and Philetus, declared that "the resurrection had already taken place." It is a little difficult to see how—even if we knew no more about the meaning of this than the author suggests—the text can be supposed to favor the present theory of the original import of Anastasis. For, in the first place, the resurrection in question must be either that of Jesus or that of Christian believers generally. But the writer of the pastoral epistles surely cannot have deemed it a damnable heresy to maintain either that Jesus had already been "raised up" as the Messiah, or had already been "raised from the dead." The question at issue is, then, evidently that of the resurrection of the faithful; and ἀνάστις can therefore be used here only in the precise sense which Dr. Smith is intent upon showing that it did not originally bear. Furthermore, we know, beyond reasonable doubt, just what Gnostic heresy is here referred to; it is the doctrine —fully described by Tertullian and ascribed by him to the Valentinians, by Irenæus to "the followers of Simon and of Carpocrates"— that the true resurrection of the believer takes place when, by the attainment of the saving gnosis, and through baptism, he is delivered from spiritual death (Tertull., *De Res. Carnis* 19, *De Praesc. Haer.* 33, Irenæus, *Adv. Haer.* II, 31 § 2). Other canonical passages cited by the author in support of his contention are even more surprisingly irrelevant. In favor of his theory about the genesis of the Dogma of the Resurrection he cannot be said to have offered any substantial evidence.

Though there remain certain supplementary points urged by Dr. Smith in favor of his principal hypothesis, the foregoing examination covers all the arguments which the author himself appears to regard as fundamental. The long concluding essay *Saeculi Silen-*

tium,[1] dealing with the relatively distinct problem of the date and authorship of the Epistle to the Romans, it is not possible to consider here. But of the main and most revolutionary theory, that relating to the origin of Christianity, it may be said, by way of recapitulation, that not only does the author's own evidence, when critically examined, fail to yield any material ground for the theory; but also that, in part, the theory is flatly contradicted by evidence in his chosen sources, of which, for unexplained reasons, he neglects to apprise his readers.

It remains to add that, while the foregoing examination has dealt with the hypotheses of *Der vorchristliche Jesus* as if there were no general, logical presumption either against or for them, they really conflict with all the antecedent probabilities in such a matter, and could therefore be justified only by the most overwhelming mass of specific historical evidences. For the theory of the book requires us to suppose that a being originally worshiped as divine, came, in a century or so, to be thought of as a person so definitely human as the central figure of the Synoptic Gospels: one born in plebeian family in an ill-esteemed province, who hungered and thirsted, who lived with publicans and sinners, who (except in manifestly late and corrupt passages) is represented as speaking little of himself, who denied his own omniscience, who was betrayed and given over to a shameful death, whose serene faith was transiently overcome in one awful moment of physical anguish on the cross; whose story was associated with definite places and historic characters, and whose brothers and kin and personal followers were, in the early second century, remembered as real persons. The Transformation of the Prophet of Nazareth into the strange, oracular figure found in the Fourth Gospel, is conceivable; but the transformation of a being even more vague and superhuman than that of the Fourth Gospel into the hero of the Synoptic Tradition, is a process that passes belief. We are not without historic examples of the apotheosis of great leaders of mankind; but there is surely no historic parallel for such a rapid and definite humanizing of a metaphysical hypostasis.

ARTHUR O. LOVEJOY.

THE FUTURE OF ARTIFICIAL LANGUAGES.

In *The Monist* for October, 1907, there appears an editorial essay on "Artificial Languages," which seems to me so full of mis-

[1] Discussed by the same writer in *The Hibbert Journal*, I, pp. 308-334.

conceptions and wrong deductions, that I venture to reply to the same. For this purpose it will be best to take such statements as I consider erroneous, and reply to them seriatim.

Dr. Carus says: "With all the interest we cherish for the promotion of cosmopolitan ideals, we do not believe that the aim can be reached by the short cut of an artificial language."

To this I would answer that this aim is only secondary, and that the object of an international language is primarily of a more practical nature, namely to make communications between persons of different mother tongues easier, whether they be travelers, commercial correspondents, scientists, missionaries, or what not. Whether or not a feeling of international goodwill springs up thereby (which seems probable) is a secondary consideration.

He continues: "We trust to nature and hope that nature herself will in the long run work out an international language, not by a formal agreement nor after the fashion of acts of international legislature, but by natural growth. When the time will be ripe the fruit will be developed, and we see the time coming when one speech will be understood all over the world. Esperantists are more enthusiastic and cannot bide patiently that far-away time. They think that by artificial methods they can improve upon nature's tedious processes."

This is the most astounding utterance of a devotee of the "scientific method" that I know of. Carried to its logical conclusion it would kill all effort in any direction; inventions would be useless, as nature will "in the long run work out" whatever is necessary, "when the time will be ripe." What is the use of "improving upon nature's tedious processes by artificial methods"? We might just as well wait for nature to build our railroads and steamships; it is certainly easier and requires much less effort.

The fate of Volapük is then explained, and the reason of its failure, but that is no argument at all against an international language. As the first really practical attempt at the solution of this difficult problem it was remarkably successful, and that it was not more perfect is easily accounted for by the fact that its "inventor" was a country priest who had never traveled and was more or less ignorant of philology or foreign languages. How many of the most useful inventions have been so perfect from the start that they could not be and were not improved? To take one instance out of many and one whose evolution we can watch at the present time: How many unsuccessful attempts have been made for the navigation of

the air, and still the experiments continue? So that the failure of Volapük and the probable failure of Esperanto are no proof whatever against the feasibility of the project. And here I would at once say that I hold no brief for Esperanto and am no Esperantist. With almost everything Dr. Carus says against Esperanto I heartily agree; from the very start I consider the alphabet too large, because it contains difficult sounds and such as are too similar to each other; and the use of diacritical signs is highly objectionable. Even MM. Couturat and Leau, who in their *Histoire de la langue universelle* have carefully analysed about sixty projects for such a language, and who strongly endorse Esperanto and consider it by far the best so far produced, devote thirty-three pages out of the sixty on Esperanto in their book to criticisms and suggestions for improvements. Although these suggestions are almost all very pertinent, not a single one of them, so far as I know, has been adopted by the Congress of Esperantists. This is sufficient proof to show that Esperanto, such as it is, is unfit to become "the" international language, and if all these improvements were adopted, it would no longer be "Esperanto."

In passing I would say that personally I consider "Bolak" as by far the best attempt so far made, even if the vocabulary is somewhat difficult; its grammar is certainly the most logical and the easiest, and with some small changes could be made to answer the purpose perfectly. But this is of course a personal opinion and carries no weight.

The editor favors "English as a world-speech" and says that it is "far easier and much more useful to learn English than Esperanto." There is no doubt that English to-day is far more useful than Esperanto, as English is spoken by about 200 millions and Esperanto not even by one million. But that it is "far easier" can certainly be disputed with very good reason. There are many trustworthy cases on record of persons having learned Esperanto sufficiently well in a week or two to be able to correspond with the help of a dictionary. And there are cases of persons and even children below fifteen having learnt Esperanto in three to six months sufficiently well to speak freely and even to make public speeches. Can such a claim be made for English or any other living or dead language? And I agree that Esperanto is not "as it claims to be," and I personally think that an easier language can be "invented." But here again it must be borne in mind that it is not absolutely necessary for such an international language to be so extremely easy, although

ease of acquisition is of course a great desideratum. The object of such a language is to serve for everybody as the "second" language, and the only one outside of one's mother-tongue (philologists or others taking special interest in languages of course excepted.) It will therefore, once such a language has been agreed upon, not be necessary any more to learn two, three or more foreign languages, in order to be able to travel in comfort, to correspond with foreigners, to read the most important scientific works, etc. Nor is such a language in reality intended for the present grown-up generation, but for future ones. It will therefore be taught in schools, and even if its vocabulary for instance should not be so "international" and therefore so easy as Esperanto, it would still require much less time for its study and much more time could be devoted to other studies in schools than at present.

But this is a digression; even if English were as easy as Dr. Carus claims, which is by no means the case, it would never be officially adopted as the international language, because other nations would very justly object to the great advantage English-speaking nations would thereby enjoy. But the English orthography alone is sufficient to prevent English from ever being voluntarily accepted as the international language. And he is right in saying that a reform of English spelling would not help much or would make matters worse. The fact is that the English alphabet is woefully deficient for the sounds it must interpret, and although the editor seems to delight in the incongruities of English spelling, I doubt whether there are many who share this delight with him. He says: "We must here enter a second protest against the statement [of the Simplified Spelling Board] that the traditional English spelling is a puzzle to the stranger within our gates. The writer at any rate knows from his own experience that his only difficulty with the English was its pronunciation, while the spelling was one of the greatest helps to enter into the very spirit of the language. In fact it almost seems as if the spelling were made for foreigners and if English were spelled phonetically it would add immense difficulty to such students." Now it might at once be said that much of the difficulty he found with the pronunciation resulted from the spelling, and if it had been spelled phonetically, this difficulty would have been much less. But leaving this point aside, Dr. Carus cannot take his own experience as an objective truth. He commenced the study of English, as he himself says, "at a comparatively late period in my (his) life"; he had a University training, a perfect

knowledge of Latin and Greek and probably of Old German or Anglo-Saxon, and he has a special talent for acquiring languages, as evidenced by his very thorough knowledge of English, his proficiency in Chinese, etc. How many of those who learn English have these advantages? I venture to say, not one per cent; and I doubt whether even he would have learnt it so well and so easily, if he had not lived in a country where English is the national language. Dr. Carus says that the *gh* in "through" reminds him of its derivation from the German *durch*, in "though" from *doch*, etc.; what proportion of those learning English spelling, whether natives or foreigners, are reminded of these etymologies? And are all foreigners studying English, Germans? Is a Frenchman also reminded of *durch* and *doch*? They only see that this *gh* is not pronounced and seems quite arbitrary, and that *ough* is pronounced in about half a dozen different ways, according to the word in which it is used tough, though, through, thorough, plough, cough, etc.). To the vast majority of those for whom an international language is intended and even to persons whose mother-tongue is English, English orthography is an immense stumbling-block; in no other language are there so many dictionaries in use, almost at every one's elbow, to clear up doubts in spelling, and it is common cause of complaint in business houses that it is difficult to find clerks who know how to spell correctly. Even university graduates are often bad spellers; at least I saw such a charge brought against an entire graduating class at Harvard. Dr. Carus puts the blame for the difficulty children in English-speaking countries have in learning to spell correctly on "the methods of teaching orthography" and the "spelling primers," which "appear to be devised for the purpose of stultifying the children and making the study as hard for them as possible." If after ages of instruction and with all the advances made in pedagogy within recent years this is the state of our "spelling primers," the fault seems to lie not so much in the primers as in the orthography itself, and the utter absence of any system that can be intelligently applied to the spelling of English words, except by learning the spelling of every word by heart, just as a Chinese has to learn every character in his language by heart. The saying of the late President McKinley* which Dr. Carus cites, that "that man must be a fool who could not spell a word in several ways," was certainly intended as a joke, or if meant in earnest, is on the

* By "our great martyr president" (*Monist*, XVII, 617) the editor had reference to Lincoln and not to President McKinley.

same level as that other saying of his that "a cheap coat makes a cheap man," thereby putting a man's worth, not in his character but in his clothes, and forgetting that in the eyes of a swell, McKinley's own coat undoubtedly appeared "cheap." The fact of the matter is that no business house will knowingly engage an office man who does not spell correctly, and that the difficulty of English spelling is therefore a great drawback and detrimental to its ever being adopted as an international language, even if there were no other objections. But international jealousy and rivalry would prevent its adoption, even if English were in all respects fitted for such a purpose. I do not say of course that English is not largely used in international dealings at the present time, but an "international" language in the real sense is not this accidental use, but its formal adoption by all the leading nations for such an object. A short time ago French was the language most in vogue for this purpose, and it is conceivable that in the future some other nation may take the lead in world politics or commerce. In that case should Russian or German or Japanese or Chinese be used as the international language? Certainly neither of them could be called "easy." But to show that it is not necessary for the spelling to denote the derivation of a word, take for instance the Italian and Spanish languages. Are these any more difficult and puzzling because "filosofo, fotografo," etc. are spelled with an *f* instead of a *ph*? Not in the least; on the contrary, according to my humble opinion these languages and specially Italian, are much easier than English, and as they are also much more euphonious and, not belonging to any world-power, would not give rise to so much opposition and jealousy as English, either of them, but specially Italian, would be much better adapted for an international language than English, if any of the existing languages would do, which I doubt. The spelling of Italian and Spanish is almost phonetic and with a few slight changes could be made entirely so; after learning a few simple rules any one can read Italian or Spanish at sight, without understanding a word of these languages, while it is absolutely impossible to read English without knowing every word and even the meaning of sentences, as some words are differently pronounced, according to whether they happen to be used as a noun or a verb.

Another reason why English (or any other living language) ought not to be taken for an international one is that they are continually changing and adding new words, slang phrases, etc. which every foreigner would have to be continually learning, while an

artificial language, not being used colloquially among people of the same nation, would remain stationary and would adopt only such new words as would from time to time be officially promulgated by whatever central authority would exist for this purpose. How many to-day can read and understand the English of three or four hundred years ago or of even a nearer period? The editor says: "If the majority of people make up their minds to spell a word in a certain way, we for our part are willing to submit, and if the spelling is not sensible we can yield to the popular demand without great compunctions of conscience." This may be admissible for one's own mother-tongue (though I deny it even there), but it certainly will not do for an international language. Should the whole world be continually on the watch, whether "a majority" spell a word differently or attach new meanings to words? The very idea seems preposterous and is a strong argument against the adoption of any "natural" language for the purpose we have in view.

He says further: "The irregularities of our grammar are by no means a fault of our languages but a very useful contrivance of nature." Why this should be so is a mystery to me; we see that as languages evolve to higher grades, these irregularities tend to disappear, (for instance, all newly made verbs in French end in *er*); modern languages certainly have fewer of them than ancient ones, and English, the latest development of all, has the least. If "irregularities have not been invented to bother schoolboys but to facilitate every-day speech," then the most irregular language ought to be the best, and Dr. Carus contradicts himself by extolling English as the ideal world-language, when he gives as a reason for its becoming so "the simplicity of its grammatical and syntactical construction"; it would not be simple, if there were many irregularities.

Another objection which he urges against any artificial language is that if "certain roots shall have definite meanings and certain endings shall indicate definite grammatical relations, the number of word formations would be so great that we would be embarassed by the wealth of the several modes of expression." This is the first time that I see this argument used as an objection to an artificial language; so far the objection has generally been on the other side, that there would not be enough words to express all the different shades of meaning. But I do not see the pertinence of the conclusion; only such words would be coined as are needed. Certainly it is an immense help to the memory, if from a comparatively

small number of root words any number of related ideas can be expressed with the help of well defined suffixes.

Dr. Carus says: "From among the many different possibilities, custom chooses one and stereotypes it to suit exact conditions."

This is undoubtedly the case in living languages, but in an international language, destined to be everybody's "second" tongue and not in everyday use among relatives and friends, no such "custom" would arise.

He says: "This process cannot be done by grammarians in the study." About this opinions differ, but the fact that it has been done and done sufficiently well to enable persons of different nationalities to converse together at their ease, though by no means in a perfect manner so far, seems to militate against this *a priori* reasoning. A great many authorities can be cited on either side of the question, and if a philologist like Max Müller says, that an artificial language can be constructed "more perfect, more regular and easier to learn" than any natural language, which statement can be supplemented by that of many other eminent philologists, philosophers and scientists, it carries at least as much weight as that of any number of other philologists, philosophers and scientists in opposition. A dogmatic "It can not be done," will not be decisive in view of the many discoveries and inventions that have been made in spite of positive predictions that it could not be done. Let it be tried, and if the first attempts do not succeed, try again and again; then we shall see whether it can be done or not. But even if all philologists etc. were in the negative camp, it would be no proof whatever. History teaches us that the members of a profession are generally the most conservative and opposed to any innovation. See the opposition of the medical profession to Harvey's discovery of the circulation of the blood, to Vesalius's discoveries in anatomy, to vaccination, etc.; the engineers' objections to Stephenson's plan for a railroad, etc. If Max Müller has "declared one after another of the world-languages to be the best possible attempt," it only shows, if true, that he considered several of the attempts already made sufficiently good and coming up to the dictum as just mentioned by him. If therefore something better still is finally evolved, it will certainly "fill the bill" and be sufficiently good for all practical purposes; it need not be "absolutely perfect," if such a thing in any field of human endeavor is possible. Why should not Prof. Max Müller give "his blessing to Schleyer's Volapük" and later to Mr. Liptay's *Gemeinsprache*, when both worked in a field he so en-

thusiastically endorsed? This does not mean that he considered every attempt the best possible one, but only that it was an improvement on its predecessors.

The examples mentioned on page 611 of a foreign child saying "you gain," when she meant "you win," etc. militate against Dr. Carus's theory of using a living language with its many difficulties and ambiguities as an international one. In such a language every distinct meaning must have a special word, no matter whether they have this in English or any other language. Because the word "spring" in English means one of the four seasons, a mechanical contrivance, a jump, etc., is no reason why in an international language each of these meanings should not have its own distinct word, and then such errors become impossible.

The fate of Volapük and the probable similar fate of Esperanto and probably of others in the near future, is no argument at all against such a language. Dr. Carus quotes from a pamphlet of Professor Brugmann: "Volapük died a natural death.... The movement split into two camps. An international world-speech academy consisting of seventeen members of twelve different countries sought to preserve uniformity and union. The inventor of Volapük, Rev. Schleyer, was expected to join them, but he reserved to himself the right of vetoing their statutes in all questions of universal language. A union could not be attained and so the whole Volapük movement fizzled out." What does this prove? That the inventor of Volapük was unreasonable, and nothing more. But as Volapük was very imperfect, which as a first serious attempt was only to be expected, it is good for the movement as a whole, that he was unreasonable and that no union was effected.

Dr. Carus says: "Other philologists who are found in the ranks of Esperantists are Professors Schuchardt of Graz, Baudoin de Courtenay of St. Petersburg, and Jesperson of Copenhagen, but how Platonic their interest must be appears from the fact that they simply sanctioned the idea without attempting an invention of their own, in spite of being themselves trained philologists." This also is a strange statement; if they are Esperantists, why should they invent another language? They probably consider Esperanto good enough (with some modifications), or they would not be Esperantists. But granted that they consider Esperanto too deficient to become the international language, has every philologist the time or the inclination or even the capacity for such a tremendous work? Must every mechanician who is in favor of aerial navigation, try to invent a

flying machine, in order to prove that his interest is more than Platonic? The very idea is absurd.

Dr. Carus makes fun of Esperanto by saying "that *patro* means 'father,' and *patrino* (literally translated 'fatheress') means 'mother'; *junolo* means 'youth,' and since the prefix *mal* denotes a contrast, *maljunolo* means 'old man.'" I see nothing funny in this: such formations are certainly a great help to the memory, and while in cases like "mother" there might be another word, yet it should be allowed in cases of a lapse of memory to coin such a word with the suffix for femininity. In Spanish *hermano* is "brother," and *hermana* (literally "brotheress" or "female brother") means "sister." The same is the case in this language and Italian with the words for "uncle" and "aunt," etc. Has anybody called this an "amusing feature" of these languages before? On the contrary, for foreigners trying to learn them, it is extremely pleasant. If Professor Leskien, from whom Dr. Carus also quotes, cannot find any other objections or must even mention these to strengthen his case, it must be very weak indeed. What I wrote about "spring" applies also to his remark on the word "church," for "place of worship" and an institution like the Catholic "Church"; there must be different words, as they denote different ideas. Such objections seem to me puerile.

Dr. Carus says: "At the moment when Esperanto was actually introduced as an obligatory study in our schools and used for international purposes, the differences and divergencies of opinion as to how best to meet them, would lead to so much trouble that the whole structure would collapse." This does not seem to me at all probable; the very fact that an international language (whether Esperanto or any other) has been adopted by the leading nations and introduced into the schools, would show that that language had passed the era of "differences and divergencies of opinion," and it would be taught and learned like any other subject. In fact there would and could be less occasion for differences, once that stage is reached, than in many other subjects; there are continually new ideas and consequently differences springing up in physics, psychology, pathology, etc., etc., but that does not prevent these sciences from being taught and learned and used in practical life.

Whether a majority of "Academies" are at present in favor of, or against such a project, or whether they are undecided, as seems to be the case, from the quotation of Professor Brugmann's letter, that they "refused any expression at all," is of minor importance. This idea will have to fight its way against the conservatism of

academies and specialists like every other great idea that ever originated in the brain of man. Eventually it will not be Academies nor specialists who will carry this idea through, but men of affairs and action.

The statement that "languages are living organisms as much as animals, and it is not more or less possible to create spiritual than it is to create physical organisms," is certainly open to grave objections. There is no analogy whatever between a language and an animal, except in a very symbolical sense; languages have been created by men, though up to the present they have not been created perfect, but nobody has so far succeeded or is likely ever to succeed in creating an animal, no matter of how inferior a kind.

That it is easy to construct such a language, grammar as well as vocabulary, is by no means asserted; that there are many difficulties to be overcome, not the least of which is the apathy of the majority of mankind, is freely conceded; but that this should deter us from at least trying to solve the task, or that it is *eo ipso* impossible, not only to invent a language fit for the purpose but also to have it universally adopted, is strongly denied.

C. T. STRAUSS.

COLOMBO, CEYLON.

EDITORIAL COMMENT.

While I do not believe that the adoption of an artificial language which should serve as a universal means of communication among people of different nationalities is feasible, I propose to have the problem discussed, and will not hinder the good work if such it be. I am not an enemy to the propaganda, but on the contrary believe that the discussion of the problem and attempts at constructing a universal language will prove beneficial. I have criticized the views of the advocates of Esperanto, but from my own standpoint I wish to give my critics also an ample opportunity to express their opinions and to censure my own propositions. I will say, however, that though I have given a careful perusal to Mr. Strauss's letter, I have not been convinced by his arguments.

I will dismiss at once a consideration of Esperanto because Mr. Strauss seems to agree with me that it does not fulfil the requirements, but I will repeat here that in my opinion the use of English would serve the purpose of an International language better than any artificial language heretofore proposed, first because it is the

easiest language to learn, and in this general statement I include all artificial languages as yet invented. It is further spoken by the greatest number of people on earth, and is likely to become in the natural process of competition the world language so much desired by Esperantists.

I grant that for the purpose of expressing one's thought with nicety and in an elegant form English is as difficult as any other language, but for the purpose of communicating in a rough way our urgent needs English is quite recommendable, and how well it adapts itself to circumstances can be seen by the formation of pigeon English, which is a kind of literal translation of Chinese into English. It is by no means elegant English speech but it fulfils the needs of communication between the English and the Chinese.

It seems strange that Mr. Strauss calls upon the authority of Max Müller although he bears in mind my references to him on the subject which suggest that Max Müller's support of any artificial language must not be taken seriously. There are men, and sometimes very prominent men, who can easily be induced to lend their name for any purpose that is not obviously objectionable, and Max Müller appears to have belonged to this class. The same Max Müller who endorses several artificial languages as the very best, claimed that languages could not be made but originated through natural growth.[1]

Mr. Strauss says that to consider languages as living organisms is "certainly open to grave objections," and I will say in reply that this expression is more than a mere figure of speech. Languages have become such by being used, by being spoken and understood, and their vital physiological growth lies in the brains of men. A language that lives in books only, a language which has never been in practical use, is not a language but is an artificial design for a language. I claim that it is as easy to produce as many artificial designs for languages as it is difficult to create a real language that would be actually spoken and serve as a means of communication. Our speech is a living language only because there are living structures in the brains of people into which it has been impressed, and the difficulty consists in making the meaning of words agree to such an extent that a sound uttered by one is understood by others in the sense, or approximately in the sense, in which it was pronounced. Languages themselves are mere vibrations of air, but a living speech

[1] Max Müller used the Greek term *θέσει*, not *φύσει*.

is a complicated organism the vitality of which lies in the cerebral structures of living and thinking beings.

I do not deny the theoretical possibility of constructing a living organism, but I deny its feasibility and also its usefulness. In the same sense I do not deny the possibility of constructing an artificial language, but for all that I deny both the feasibility of it and its usefulness. I believe that the international language which will be spoken by all mankind on earth will come. I have the firm conviction that it is bound to come. I also believe that those idealists who try to create an artificial language for this purpose will act as pioneers in the line of these aspirations, but I do not believe that they are called upon to complete the work or that they will be successful in their endeavor. They are and will remain voices crying in the wilderness, and the fulfilment of their hopes will be as different as the Christ that was finally accepted by mankind was different from the Messiah ideal of the disciples of St. John.

While I do not believe that we can make plants or even living organisms by artificial means, I do not deny that we can improve the existing species. Mr. Strauss misinterprets my propositions when he thinks that I would oppose progress or ridicule the attempts at improving existing conditions, be it in spelling or pronunciation or grammar, but the successful reformer in all lines will be he who follows nature and builds upon those products which nature has given us. Burbank and Nilsson do not try to create new plants out of inorganic matter but they take the plants which nature furnishes us and improve them in such a way as to be more suitable for our needs and purposes. Accordingly I suggest that the method of reformers in the line of language should employ the same methods. Let them take the languages that exist and improve them.

English has, at least in my opinion, the best chance of becoming the world language, but it is by no means the only language that competes for this place of honor. I believe that to some extent Spanish has also been extremely successful. It has conquered the entire America south of the Rio Grande, and I would point out that it also possesses qualities which would enable it to become acceptable as a universal language.

Spanish has two great preferences over the English. One is its sonorous sound, the other its spelling, but I can not help thinking that the spelling problem is not quite so serious as Mr. Strauss makes it. It will be settled one way or another within reasonable time, and while I propose to move slowly in the line of spelling

reform, because the present method does not appeal to me, I am in sympathy with the aspiration for reformed spelling, and perhaps also for a reformed pronunciation.[2]

In theory it is quite possible to construct a living animal. I learn that in one of the laboratories of Johns Hopkins University, organs of frogs have been so transferred that practically new animals are composed. The heart of one frog is inserted into another, and if I can trust my informer (Professor Mall) kidneys have been inserted in cats and rabbits in out-of-the-way places where these kidneys continued their original function of filtering blood and producing urea. The possibilities of artificial combinations of this kind are unlimited, but in my opinion the experiments prove as little the feasibility of constructing an organism out of inorganic elements, as reformations of speech, grammar, spelling, etc., justify a belief in the creation of an artificial language.

Mr. Strauss will say that this is a dogmatic assertion and I grant that it is. I can only say that those who believe in the construction of artificial languages are welcome to try, and if they fail to try again. I am willing to watch the several trials, though the lifetime of one generation will not be sufficient to see all the failures resulting therefrom. Mr. Strauss misinterprets my position in several ways, and I will incidentally collect a few of his comments. He thinks that I would imply that the most irregular language ought to be the best because I say that irregularities of grammar are useful contrivances of nature, occurring in the most used words such as auxiliary verbs and other terms of common use. But I deny that my view of the origin of irregular forms leads to the inference which he draws therefrom. Irregularities originate according to our needs, and to increase them beyond their needs would certainly not be desirable. In the same way in rapid writing, such as shorthand, we use certain abbreviations. They are useful and serve their purpose, but if we would abbreviate every word we would soon find out that they would no longer be serviceable.

I believe that if an artificial language would really be accepted it would very soon introduce certain irregularities, abbreviations, typical phrases, etc., all of which would form exceptions or special applications or peculiar modes of expression analogous to the ir-

[2] The English speaking people might meet other nationalities half way by dropping some of their peculiarities of pronunciation. In my opinion there is no reason to drop the *g*, *k*, and *p*, and other consonants before liquids. At any rate English speaking people can pronounce these letters as well as foreigners in such terms as psychic, gnostic, gnome, knight, knife, etc.

regularities of the natural languages. They all would have to be learned in the same way as the grammar and irregular forms of natural languages, and an artificial language would therefore have not the slightest preference in this respect over a natural language.

The choice of terms must be decided by usage. When I referred to the difference of meaning in "you gain" and " you win," and how these two words which originally meant the same had been differentiated in English, I meant to call attention to the fact that such differentiation of meaning and an establishment of one definite meaning must precede that state of a language in which it becomes definite and intelligible. So long as words may mean whatever they imply by etymology the language is still like a charade. Its meaning must be guessed.

I expect to see the dethronement of Esperanto from its present place of prominence, nor do I doubt that other attempts will be made; —or rather I am cognizant of the fact that they are being made now.

Mr. Strauss seems to think that the construction of such a language would not be easy while I take the opposite view. It seems to me that such languages can be constructed with great facility upon very different foundations, either upon the Teutonic elements of a pan-German, or upon the several idioms of Romance speech. In either case it would be easy enough to supply a grammar or a vocabulary analogous to those in existence, but to make such a language acceptable to the people, to introduce it, to impress it into the living structures of human brains will prove to be a task beyond the power of mortal man.

At any rate I feel sure that it could not be introduced by either a majority vote, or by force or through the instrumentality of governments, and if it existed, if it were really accepted, it would still be doubtful whether it would be a fit vessel to receive the thought of scientific work as well as the poetry of the different nations. If it would serve as a medium for commercial purposes it might not be fit for any other use.

The main objection to the English which finds the readiest echo is the argument voiced by Mr. Strauss in these words: "The other nations would very surely object to the great advantage English speaking nations would thereby enjoy." However, it seems to me that if English becomes the world language it will not be through the consent of other nations but by sheer power of circumstances. People of different nationalities must make themselves understood,

and I believe that the English language has so far best fulfilled all the requirements.

One reason why, according to Mr. Strauss, neither English nor any other living language ought to be selected for international use is the fact that "they are continually changing and coining new words, strange phrases, etc., which every foreigner would have to be continually learning." I reply that if Esperanto or any artificial language would become a real true international language it would just as much continually change and add new words. If it did not it would not serve its purpose. The introduction of new ideas, new views, new aspirations, etc., require new terms, and if such modifications were excluded from an artificial language it would never hold its own against a truly living speech.

AUTHOR'S REJOINDER.

With regard to your reply I take exception only to the last paragraph, wherein you imply that I made the statement that an artificial language would not need new words from time to time. I certainly think that it does need additions to keep up with the progress of the world. But while in natural languages these new words are coined either by the inventors of new "things," or by popular usage, in an artificial language it would be done scientifically to fit into the structure of that language. And I expressly stated in my article not that in an artificial language the introduction of new words and other modifications would be excluded, but that it "would adopt only such new words as would from time to time be officially promulgated by whatever central authority would exist for this purpose."

AN EXPLANATION.*

To the Editor of The Monist:

Permit me to rectify an error, or rather give an explanation, with reference to my articles on "The Third Movement of the Earth" which appeared together in the July *Monist*.

On page 401, lines 4 and 5, it is said that observations have assigned to the movement of the third rotation a velocity of 48" a century, which causes the rotation to be accomplished in 2,700,000 years.

* Translated from a personal letter of M. Beziau.

Then on the last line on page 404 we read that the movement is 46″ and the rotation is accomplished in 2,800,000 years.

Here is a contradiction which would puzzle your readers and I owe you an explanation.

The number 48″ is the result of my personal calculations, and 46″ is that given by the *Annuaire du Bureau des Longitudes* at Paris. The two computations differ by the insignificant amount of 2″. When I speak of my personal work I use my own figures. Under other circumstances I purposely employ the figures which have been scientifically approved.

Moreover, I was formerly in agreement with the Bureau of Longitude who then indicated 48″, but the Bureau has changed its computations and now gives a velocity of 46″.

If I had thought that the two contradictory figures would be used side by side, I would have made them consistent.

PIERRE BEZIAU.

PARIS, FRANCE.

"THE THIRD MOVEMENT OF THE EARTH."

To the Editor of The Monist:

The article appearing in *The Monist* of July, 1908, under the above quoted head, by Pierre Beziau is interesting from a certain standpoint and ingenious; but the author is handicapped in not being familiar with the mathematics of astronomy, and, we may add, with descriptive astronomy. If the matter had been as simple as M. Beziau seems to think, the labors of La Place, Le Verrier, Adams, and a host of other mathematical astronomers would have been rendered useless. The law of gravitation (which is that every particle in the universe attracts every other particle with a force varying directly as the sum of the masses of the two particles and inversely as the square of their distances apart) is the proximate cause of a wonderful complexity in the motions of the heavenly bodies. It has required the combined energy, skill, and genius of mathematicians extending over three centuries or more of time to reduce the apparent irregularities of motions of the heavenly bodies to regularity. The most refractory of all has been our nearest neighbor, the moon. She has up to the present moment successfully defied them all. She has yet a small irregularity which is a bone of contention among astronomers. Some say this irregularity is accounted for by the slight retardation of the earth's rotation on her

axis during the ages, due to tidal friction. Others say, "No. A part of this irregularity can be so accounted for, but not all." But for the most part the motions of the heavenly bodies constitute a solved problem; or, perhaps we should say, a series of solved problems.

M. Beziau's third motion is the present slow change in the obliquity of the ecliptic (the path of the sun's apparent motion among the stars, the real path of the earth, regarding the sun as fixed in space). He gives this change as 46″ per century, given as 45½″ per century by some authorities. Now, if this change were constant, the time would come when the axis of the earth's rotation would become perpendicular to the plane of its orbit; and still later the axis would swing over until it would lie in the plane; thus passing through every possible angle to this plane. But La Place reduced this motion and referred it to the law of gravity; and his computations have been since verified by other mathematicians. It is found that this change in the obliquity of the ecliptic is due to the change in the path of the earth's motion, due to the secular effect of the attractions of the other planets—sometimes pulling her off at an angle on one side of a fixed plane, and then on the other side of that plane. This fixed plane is one established by astronomers for the purpose of convenient reference for the orbits of all of the planets. It coincides nearly with the plane of Jupiter's orbit. The extreme swing of the earth's path from this plane is but 3°. At present the earth's orbit is about 1½° from the fixed plane. The obliquity will continue to diminish for ages; but the extreme change of the inclination cannot be more than 3° from its mean position.

Even if the third motion were a continuous rotation instead of an oscillation, as it is, it would fail to explain glaciation. The mean effect of a fixed amount of heat radiated to the earth from the sun is the greater the more uniform be the radiation to the surface; for this reason: The production of ice and snow is rapid during the intermission when the heat from the sun does not reach the earth. The greater the ice and snow, the greater will be the portion of the heat reflected back into space. This fact, generally ignored by writers on glaciation, is that where ice and snow are formed the cumulative effect of heat is at a maximum when the radiation to the surface is uniform. This condition would be most nearly approximated when the earth's axis is perpendicular to its orbit. So here M. Beziau's reasoning fails.

M. Beziau attributes the change in the obliquity of the ecliptic to a change in the position of the celestial equator, or the equinoctial,

and says, "this movement has been attributed to the ecliptic since its discovery without profound investigation, and on this hypothesis La Place and Le Verrier have rightly limited its extent. They have not properly considered the hypothesis in which the movement would belong to the equator. In that case they would be able to limit neither its extent nor duration."

It is a sufficient answer to this statement to say: If the obliquity were due to a change in the equator, a certain change in the declination of the stars would result, while the latitude of the stars would vary in a different manner. But if the obliquity be caused by the change in the earth's path (the ecliptic) the case would be reversed. Now it is the fact that the latitudes of the fixed stars so change as to be explained only by a change in the plane of the ecliptic itself. A slight knowledge of trigonometry and a moderate familiarity with the facts of practical astronomy would enlighten M. Beziau upon this phase of his theory.

M. Beziau's so-called law that "The planets turn about themselves on an ideal axis perpendicular to the plane of their orbit in an opposite direction from their movement around the sun and in a time equal to that of their revolution," is a law only so far as appearances go. To one located at the sun they would appear to so revolve, and this is for the same reason that one looking out of a car window forward and to the right sees the landscape rotate to the left, while if he looks forward and out the window at his left the landscape appears to rotate to the right.

M. Beziau's statement is very far from the facts when he says the rotation of the earth and moon about their common center of gravity is the cause of the "principal irregularities," "of the precession, the retrogression of the nodes of the moon, the nutation, the oscillation of the lunar orbit, libration, etc." The fact is that none of these motions can be so explained. The only effect of the rotation of the earth and moon about their common center of gravity is to make a slight sinuosity in the paths of their centers. In fact, the change can be called sinuosity only when compared to the curve of average position; the actual line of motion in each case being always concave toward the sun, the center of curvature being always in a direction toward the sun; the radius of curvature of the path of the moon's center being longer at new moon and shorter at full moon, and the radius of curvature of the path of the earth's center shorter at new moon and longer at full moon.

Libration is very easily explained, and is not a motion at all,

but an apparent motion merely. The motion of the moon on its axis is uniform, while the angular motion in its orbit is variable; so when the angular motion is greatest, the motion of the moon on its axis appears to be slightly retrograde, and *vice versa*. Libration is an apparent oscillatory swing of the face of the moon, giving us an opportunity of seeing about four sevenths of its surface in the course of the lunar month. Besides the libration of the moon in longitude explained above, there is a libration in latitude due to the inclination of her pole to her orbit, first nodding one pole toward the earth and then the other, behaving as the earth does to the sun and from a similar cause. Again, a daily libration is due to the rotation of the earth on its axis. If we see the full moon at six o'clock p. m., we see a slightly different surface twelve hours later, due to our changed relative position, 8000 miles at right angles to the line of sight.

Precession and nutation are firmly established on a mathematical basis and by observation as well. The former is caused by the attraction of the sun and moon on the protuberant mass at the equatorial regions because of the oblateness of the earth's form. This is not a direct effect, but a differential effect—the difference between the attraction for the side toward the attractive force and that for the side from it. There is no foundation for the statement that attractive forces attract the centers of mass only. Attraction affects every particle separately, the same as though they were in no way connected. Precession causes the pole of the earth to swing around the pole of the ecliptic once in 25,800 years.

Nutation has a similar cause in the moon, causing the pole of the earth's axis to describe a small circle in the heavens once in a lunar cycle of 18.6 years.

Likewise the gradual change of the angle of inclination of the moon's orbit to the ecliptic is due to planetary attraction, and is an oscillatory change, not a rotation.

To go deeply into the mathematics of these questions would require volumes. There are a large number of apparent irregularities which M. Beziau does not mention, the change in the longitude of perihelion, the rotation of the line of apsides, changes in eccentricity of the orbits of the planets, and other smaller secular changes.

It will be sufficient to say, in answer to his broad claims, that practically all these apparent inequalities have been computed mathematically and have been verified by observation; and what will be necessary for M. Beziau to do is to overturn the mathematics of La

Place and all the great mathematicians since his time, if he would convince the scientific world. His "third motion" is as inefficient as were the cycles and epicycles of the old Ptolemaic system of astronomy.

And still further, M. Beziau's third motion is impossible from a mechanical standpoint. It is a well-known fact of mechanics that a rotating body can have but one axis of rotation when rotating freely due to its own momentum. If the body be impressed with forces simultaneously or alternately tending to give it motion of rotation about more than one axis a single resultant axis of rotation is produced about which single axis it will continue to rotate until some other impressed force causes a new single resultant axis of rotation. The gyroscope in its various forms is a practical illustration of this fact of mechanics. A force brought to bear tangentially to a meridian line of the rotating body will cause the axis of the body to describe the surface of a double cone, the center of oscillation being the common apex, and this is just what happens to cause nutation and precession by action of the moon and sun. Much more is to be found in the article by M. Beziau which may be criticised from the standpoint of mathematics and physics, but it would be useless to go farther; enough has been said to show how utterly untenable is his theory.

CHARLES H. CHASE.

LANSING, MICH., Aug. 1, 1908.

ON HYPERSPACE.

To the Editor of The Monist:

Although the statement of your position with regard to the question of hyperspace, as given on page 471 of your current volume, is in the main highly satisfactory, it seems to leave something to be desired. When we are confronted by an apparent breach of the law of continuity, it would seem more logical to explain it as the result of a relative rather than an absolute limitation. If I walk three paces and bring up against a stone wall I say, "Here is an obstacle that I can not at present surmount;" I do not say, "This is the end of the universe; there are no more paces beyond." That we are three-dimensional beings living in a three-dimensional world is beyond doubt; but it would appear logical to regard this dimensional limitation not as inherent in the nature of things, but as due to

some kind of constraint. In *Knowledge* (London, July, p. 157) H. Stanley Redgrove submits what he regards as a mathematical proof of the infinite dimensionality of space. Without discussing the validity of his reasoning here I submit that his conclusion is in stricter accordance with the laws of continuity than the ordinary assumption. My object in writing this is to make a suggestion regarding the kind of constraint to which our present limitations may be due —a suggestion which at the same time seems to offer a solution of a difficulty that must have presented itself to all students of this question. If matter may exist in a space of higher dimensions than itself, why might not two-dimensional or one-dimensional matter exist in our three-dimensional space? Now although, for argument's sake, two-dimensional matter has often been assumed, I have never seen any suggestion of its possible nature. Let us suppose an ether of three dimensions and matter consisting of modifications of portions of this ether—vortices, strains, or what you will. If these be due to three-dimensional motions, we shall have three-dimensional matter, but if we suppose the ether constrained in such a way that its motion shall be uniplanar (parallel to one plane) then, although the ether itself remains tri-dimensional, the material world due to it will be two-dimensional; in other words, the matter in this world, the natural forces, and so on will have, to all intents and purposes, only two dimensions. The molecules, to be sure, might really have three dimensions—they might be vortex-filaments, for instance; but so far as any mutual interaction is concerned—any sense-perception, for example, exercised by organisms made up of them, their world would be limited to two dimensions. Now, if this be so—and I can see no escape from it—we may in like manner have a four- or five- or infinite-dimensional ether constrained to perform all its motions parallel to a three-flat. Its motion might perhaps be called by analogy "uni-tri-flat." Then we should have the exact counterpart of our present universe; and such I prefer to think that it is. It would seem also perfectly legitimate to speculate about what might happen if the constraint should "slip a cog" and drop down to a four-flat constraint, or if it should be removed altogether.

All this is quite agreeable to your statement that "as soon as we make an *a priori* construction of the scope of our motility, we find out the incompatibility of the whole [four-dimensional] scheme"; only it views the incompatibility as due to some form of constraint and not to the inherent necessity of a tri-dimensional world.

It is evident also, of course, that the idea of such a constraint

is quite independent of the particular form that has been given to it in the above suggestion.

ARTHUR E. BOSTWICK, PH. D. (Yale).
NEW YORK PUBLIC LIBRARY, July 27, 1908.

A COMMENT ON PSEUDO-GEOMETRY.

The article of Mr. Chas. H. Chase on "Pseudo-Geometry" in the last issue of *The Monist* (pp. 465-467) has most certainly been welcomed by all mathematicians, desirous of keeping our infallible science free from absurdities and chimeras. In fact it is surprising how the fallacies of Lobatchevsky and Bolyai could find so many followers. I maintain that Euclid's Ax. XI does not permit the existence of what its promoters call "non-Euclidean geometry" etc. Permit me to prove my position.

Two straight lines in a plane either intersect in one point or they are parallel. This fact is so simple that Euclid did not even deem it necessary to mention it as an axiom; however, it is necessary to bear in mind, that he had no conception of an unlimited space, plane or line, and that he reckoned with *positive* magnitudes exclusively. Intersecting straight lines converge towards their point of intersection and diverge from it, which fact, if the point of intersection lies within the illustration (drawing), can be observed by ocular inspection. It was the practical geodetist Euclid, who gave in his Axiom XI the means to ascertain the direction of convergency, if the point of intersection is at a distance. Now as much as the sum of the two inner angles on the side of convergency is less than two right angles, so much does it exceed 180° on the side of divergency, for the sum of all four of these angles equals 4 right angles. For the case that the sum of the inner angles on either side of the transversal amounts to exactly 2 right angles, this indicates neither convergency nor divergency in either direction: the two lines are *parallel.*

Euclid deduces from Axiom XI the theorem that *parallels intersect any transversal at equal angles,* which he makes use of to prove, that the sum of the three angles of a plane triangle equals 2 right angles. Perhaps it might have been of advantage to give the above wording to the axiom upon which to base the theory of parallels and make the present official wording a scholium.

May these explanations help to expel from exact science a plane that in fact is part of a sphere with an infinite radius, a triangle in

which the sum of the angles is less than 2 right angles, and a space of more than three dimensions.

FRANCIS RUST, C. E.

PITTSBURGH, PA.

MR. GERALD CATOR'S SCHOLASTIC GOD-IDEA.

Mr. Gerald Cator's article "Id Quo Majus Cogitari Nequit" is indeed what he calls it, "a scholastic essay." The character of his whole thought is scholastic and its deductions follow the method of scholastic logic. Modern thought has become alienated from this method of argumentation, and we feel sure that naturalists will simply turn their backs upon it. Nevertheless the article contains a good deal of thought which because of a general opposition to scholasticism is at present neglected. We are keenly conscious of the shortcomings of this almost mediæval mode of thought, and it seems strange that there are thinkers to-day who cling to it with such tenacity. But modern thinkers, especially naturalists, are apt to overlook the objective significance of pure logic and of all the interrelations implied in purely formal thought. It is for this reason that we deem it worth while to understand scholasticism and to preserve what is true in it.

Mr. Cator is certainly right when he insists, "that if to any degree we know anything, we can not be perfectly ignorant of anything else.... Blank ignorance as to the nature of things is in the strictest sense impossible.... Once true, always true, etc."—truths so often ignored by both the agnostics and the pragmatists.

Our thought indeed tells us something about the nature of reality, and modern naturalists use the same scholastic arguments much more than they themselves know. There is more apriorism even in a man like Haeckel than he himself is aware, although the modern naturalist is in the habit of denouncing apriorism and commonly thinks himself free from it.

The editor has treated Mr. Cator's subject in a recently published book entitled *God: An Inquiry into the Nature of Man's Highest Ideal and a Solution of the Problem from the Standpoint of Science,* and there is an agreement in the titles themselves, though Mr. Cator expresses it in abstract and more ponderous style for which the Latin language is more appropriate, saying *"Id Quo Majus Cogitare Nequit."* Considering the result, the agreement as well as the differences are obvious. While we believe in a center that

can not be shifted or changed, we insist that the center is not of an individual nature, it is not a particular place, it is not a personality after the fashion of man. The very expression "center" is purely allegorical, for it is a center which is omnipresent; it is an ideal center. It is a center only in the sense that the normative factors of the world constitute a unity, a systematic and consistent whole, but it is not local nor does it partake of any of the characteristics of particularity.

Accordingly we see in Mr. Cator's scholastic treatment of the subject an anthropomorphic statement of a truth of which he has caught a glimpse, and the significance of which he has understood as an astrologer may grasp the grandeur of astronomical truths.

EDITOR.

A COMMENT ON "EVOLUTION AND THE SOUL."

I read with great pleasure Dr. Carus's thoughtful and original paper in the April *Monist* on "Evolution and the Soul" and with his permission would make a brief comment.

I am glad Dr. Carus believes the universe is intelligible, and that he does not think the origin of life is an unfathomable mystery.

Dr. Carus affirms that "it may be considered as an established fact that life is a function, not an entity or substance." Who has established this? Are there not great physicists on the other side, and does not Dr. Carus hypothecate his own contention when he says that life is a "phenomenon *sui generis*?" And how does he know it is the "tendency of certain elements to organize into life-plasm?" Is it not well to remember that evolution is not a potentiality, but a path? Now a path cannot make itself, nor determine who shall walk upon it. Dr. Carus is so enthusiastically a monist that he hesitates to say there are two things, soul and body. Yet mind or soul may have been in some primeval atom, and while mysteriously united with matter mind may not have been an efflorescence from it. When we attribute an effect to the vibration of the ether, to chemical or physical action, have we exhausted the whole truth of things?

Dr. Carus states that "all existence bears in itself the power of spontaneous motion." Is not this disputed by the great physicists, for example, Lord Kelvin and Sir Oliver Lodge?

And does he not leap over the gulf (which he himself admits) between the physical and chemical world and organized life by the

phrase, "that every atom possesses subjectivity, a potentiality of feeling, out of which the soul of man is woven?" Is not this Tyndall's theory, though I believe he abandoned it in his later years?

Dr. Carus says "that mind is nothing but the sum total of, and the interactions among all these feelings." Is not this pure guessing? How does he cross the gulf between feeling and volition, sentiency and creations like the Parthenon, the Sistine Madonna, Hamlet, and *The Descent of Man*?

And I ask, how do we know that "character is a matter of form," that "life is simply a question of *form*?" Dr. Carus affirms that the material form produces the feeling. But may it not be that the feeling produces the form? Can blind forces create an intelligent soul? May not life, which is dependent on matter for its phenomenal appearance, be independent of it? Do things come to their fruition, not by the higher but by the lower element?

JAMES G. TOWNSEND.

JAMESTOWN, N. Y.

EDITORIAL REPLY.

The Rev. James G. Townsend is a preacher highly respected among the fraternity of Unitarian ministers, and we give publicity to his criticism to show our readers the problems implied and what men of a different position have to say on these subjects; but we hope we shall not be obliged for that reason to reply to all the questions that he raises, because they would actually demand the writing of whole volumes in order to be thoroughly answered. We can only say that the monistic world-conception is simple and disposes of many problems which in a dualistic philosophy become extremely involved and improbable. We can see the mind of a child grow in perfect parallelism with his body according to the amount of experience that he imbibes. We have every reason to assume that the origin of the soul takes place simultaneously with the origin of the body, and so we come to the conclusion that life, the activity of a living organism, is not a substance but a function. But even assuming that life were not a function but an entity, the difference of the life tendencies would originate according to their different forms and so even on this assumption character would remain a matter of form.

That certain elements have a tendency to organize into life plasm is a matter of observation, not of theory. It can be verified as well as the other fact that under special conditions some elements

have the tendency to crystallize. The same is true of feeling. That feeling originates is a matter of experience and the question is merely how to interpret its origin. The dualistic explanation advocated in former centuries must be regarded a failure on account of the extraordinary complications which it involves, while a monistic conception has so far proved satisfactory before the tribunal of science. The only objections which have been raised against monism have been made from the standpoint of religion on account of its insufficiency on moral and emotional grounds. And here I believe that a deeper knowledge of the facts will enable us to take an attitude that will overcome these objections.

BOOK REVIEWS AND NOTES.

DIE PERSONENNAMEN IN DEN KEILSCHRIFTURKUNDEN AUS DER ZEIT DER KÖNIGE VON UR UND ISIN. Von *Dr. P. Engelbert Huber, O.F.M. Assyriologische Bibliothek*, herausgegeben von *Friedrich Delitzsch* und *Paul Haupt*, XXI. Leipsic: Hinrichs, 1907. Pp. viii, 208. Price 36 m.

This volume contains the following chapters: (1) Preface; (2) List of abbreviations used in the book; (3) Introduction; (4) Enumeration of the several texts and publications from which the "personal names" have been extracted. This paragraph embodies also a discussion of the "mode of dating" the tablets, of the "nomenclature of the months," etc.; (5) The formation of the "personal names"; (6) Classification of names; (7) Names of women; (8) The "sacred names" used in the formation of the *nomina propria*, such as "names of gods," "sacred districts," "sacred cities," "sacred *Kultstätten*," "sacred symbols," "sacred *Kultgegenstände*," "deified kings," "foreign deities"; (9) List of "personal names" occurring in the documents of this period, so far published. This list is followed by an enumeration of the "names of gods," "names of deified kings," "names of temples," "names of cities," "names of rivers," and all other "predicative elements" which form part of the "personal names."

Seeing that the most important part of the book is the "List of personal names," I shall confine myself to that chapter. Right here, however, I must mention the fact, in order not to be misunderstood, that Huber, having been a pupil of Professor Hommel, would naturally follow quite closely in the footsteps of his teacher and master. Not only in the introductory chapters, but all through the book, in the several notes and explanations, we can detect the teachings of Professor Hommel, which are, though very often quite ingenious, mostly against the reviewer's own conception of the religion of Babylonia. It would, therefore, be entirely out of place here to argue against them with the pupil, instead of the master. Apart from this very marked influence every student of the religion and history of the Sumerians and Semitic Babylonians will know, I am sure, that most cordial thanks are due to Dr. Huber for his labors and pains in having put before the scholars and the public in general a compendium of names which reveal to us the very heart throbbings, the religious aspirations, feelings and teachings of a people living about 700 years before the time of Abraham ,i. e., at about 2700-2300 B. C. In fact, the contents of this book are so important that no student of religion and history, but especially no student of the Sumerian and early Semitic Babylonian language, will be able to do without it. In short, the names contained in this book are a veritable mine of information.

On account of the importance of these names it is the more to be regretted that Huber was not quite equal to his task, that he was not able to do justice both to himself and the names here treated. It almost seems to me that the author undertook a subject which was and is somewhat beyond his capacities both as a Sumerian or Semitic linguist and as a student of religions—and this notwithstanding the fact that Huber himself is a theologian.

When using this book—in order to be reasonably certain of either the proposed readings or translations—the student will have to refer constantly to the original, so little reliable are the readings and translations. Single signs and whole groups of signs have been either misread, or misunderstood, or left out, or wrongly divided, or wrongly connected. In some instances only the first half of the name is given, while the other half is left out. In other instances the first half of the name is omitted, while the other half is registered. Sometimes the official title of a person has been made to be a part of his name, while at other times what was considered to be a title and hence was omitted in the transcription, forms an integral part of the name. The alphabetical arrangement is most careless, thus preventing the student, in many cases at least, to find the exact place where a name may or may not have been registered. Considering all these shortcomings, it is with a great deal of regret that we have to say that Huber had under discussion one of the finest subjects from a religio-historic standpoint, but he missed his opportunity!

To give and correct here all the mistakes, misreadings, and mistranslations would lead me too far. I shall confine myself, therefore, to a few most flagrant examples, which would justify the above-given criticism.

P. 41a, *ni-ku* in *A-a-ni-ku*, though followed by *lugh*, is a title. P. 42a.b, *Ab-ush*(!)*-shu-shag-ga*, *Ab-ta*(!)*-shu-shag-ga* and *Ab-ba-ush*(!)*-shu-shag-ga* are one and the same name. P. 44a, the *nu*, in *A-ga-nu*, belongs to the title *nu*(!)*-banda-gud*, which follows the name. *A-gish*(?)*-gibil-gim* is, of course, identical with the name read on p. 41b, *A-ba*(!)*-bil-gim*. P. 45a, *a-mur*, can never mean, according to Assyrian grammar, "*sieht*"! *A-mur-En-zu* means "behold, oh Sin!" This also against the corrections on p. 208, where the translation "*ich schaute*" is proposed. *A-chu-um-ilu* means "A is god." *A-chu-ba-am* has to be transcribed *A-chu-iqisha-am* (or *qâ'isham*), i. e., "A. has given," or "is the giver" (i. e., of life or of a son etc.). P. 46a, *Al-la-bil* has to be read *pa-al shangu-ne*. P. 47a, *Ama-ra-ki-ag-ra* is no *nom. propr.*, but signifies "to his beloved mother," notice the verb *ba-an-na-gi-in* which follows it. *Shim* in *Ama-shim* is the sign *SHIM+PI*. P. 47b, the first three names, beginning with *apin*, are no *nom. pr.*, but official titles. On p. 48b we are told that *Azag-ga-ni* is the father of *Nam-gin-tur-na-mu-tar*. But on pp. 138b, 139a the latter name is divided into two, i. e., *Nam-gin* is said to be the son (*tur*) of *Na-mu-tar* and of *Azag-ga-ni*! Does Huber call this *uniformity*, or will he deny in the face of this example that he had not the faintest idea of what he was registering? The passage from which these names are taken reads "so and so much for *Azag-ga-ni*, so and so much for *nam-gin-tur Na-mu-tar-dumu-ni*," i. e., "for the 'child's service' of *Na-mu-tar*, his child"; in other words, *Na-mu-tar* was a daughter (! *gin=amatu*, *nam-gin=amtûtu*, *nam-gin-tur=amtûtu sha mârtu*, or something like it) of *Azag-ga-ni*; both, father and daughter, have hired themselves out and receive their wages! P. 49a, *Azag-lal* does not belong to the *nom. pr. Shesh-kal-la*, see p. 152a. The *A* in such names as *A-ga-ga*, *A-gish-gar-ra*,

A-gu-gu, A-gul, A-da-da, A-lul-lul, etc., etc., is not a part of the name but signifies "hire, wages," i. e., *A=bilat,* see *B. E.,* XVII, part 1, p. 38, note 13. P. 49b, the names *E-a-gal* (read *galu*)-*bi* and *E-a-gal-gu* belong together. Neither "*E. ist der Mann des Wortes*" nor "*E. ist der Mann von Gu*" is a correct translation. The sign read *bi* or *gu* is the same as that of *REC* 555. i. e., it is *duq.* Br. 5891; Meissner 4216; cf. Thureau-Dangin, *Z. A.,* XVIII, 120, 2. *Galu duq* again is an abbreviation of *galu duq-qa-pur=pacharu,* "potter," cf. II R 58, 57b, *dingir duq-qa-pur=ilu E-A shá pa-cha-ri.* Both names, therefore, have to be translated "Ea is (was) the potter," i. e., "Ea has formed, created those persons." P. 51a, the "15" does not belong to *E-zi,* cf. *loc. cit.,* col. III, 14. *Edina* has to be read *RIQ* or *SHIM* and is an official title. P. 51b read *En-ud-sud-*[*shu*]. For *En-(d)Ba-u* read *A-SHAG azag* (*d*) *Ba-u. En-(d) Nannar* and *En-(d) Innanna-Unuk* are no proper names but signify "priest (*pashishu*) of N, and I." *En-lil-ki* is likewise not a proper name, but *dumu En-lil-ki* means "a Nippurian." P. 52a *Erin-da, Ib-da* (p. 52b), *U'-da* (p. 55b) are one and the same name; the first reading is the only correct one. P. 52b, *gal-til* does not belong to *Igi-bar.* P. 54a read *I-be-Sin.* P. 54b *Ish-da-gan* is only the second half of the name, cf. p. 154a, above. P. 55a, *ni-ku* does not belong to *I-til* (*I-til-a=In-til-la*!). *U-edin* has been misread; read (*sham*) *Shim-e* and cf. *En-u* (=*sham*)-*shim-ma,* p. 51a. The same misreadings we find again in *U-edin-Ba-u, Lugal-u-edin, Nin-u-edin.* P. 55b after *Utu-ma-Nina-ki* the *TAG* has been left out, for this name and its pronunciation see Br., Meissner, and Thureau-Dangin. P. 57a, for *Uru-gal-gir-uru* read *Ush galu gir-nita,* i. e., "Ush, the *shakanakku*"! (*Uru*)-*dun-gi-sib-kalam-ma* has been registered already on p. 56b. P. 58a, read *Gir* (or *Ur*)-*ra-ur-sag* for *Uru-ra. Gin-ush-shal-mach* (p. 59a) and *pa-al* (p. 59b) after *Ur-E* are titles. P. 60a and p. 70a read *Ur-en-gal* (instead of *ku*!)-*du-du.* P. 60b read *Ur-Ba-gá* (instead of *bi*!). P. 61a read *Ur-lil* (for *gal*)-*li,* cf. p. 64a. P. 69b read *Ur-zu-*[*ab*] and the name immediately following *Ur-du*(*l*)-*shar-gub-ba,* cf. p. 63a. P. 70a read *Ur-En-zu* (! for *u*). P. 75a read for *Ur-(d) ba-dug=Ur-(d) Dul-shar-gub.* P. 76a read *Ur-Engur* (for (*d*) *gar*). P. 77a read [....]-*an* (*d*) *Ba-u* for *Ur-(d) dingir-ba-ú.* P. 79b sub *Ur-kal-kal* cf. *Mi-da* with *Uri-da* (p. 56a)! P. 82b read *Ur-(d) En-lil-lá* for *Ur-(d) Sa-lal.* P. 83a *Uz-nam* is interesting. The tablet from which this name is taken is an "inventory," the line in which this name (!?) occurs reads *uz nam-banda NIN-AN-ra,* i. e., "the goats (=*uz*) of the prefecture belonging to *NIN-AN*," for which see also B. E., XVII, p. 4, note 8.

But *sapienti sat!*

HUGO RADAU.

PHILADELPHIA, PA., Aug. 26, 1908.

Two publications lie before us which are an exposition of the bitter controversies that have ranged in Philadelphia concerning the dignity and ability of Prof. H. V. Hilprecht. We have abstained from making any reference to this very important affair, and do not now propose to enter into the details of the discussion. The publications before us contain a thorough exposition of the subject, and one of them, published by Professor Hilprecht himself, contains all the documents, evidences, and statements that have been offered pro and con. We learn that Professor Hilprecht is again in Europe, and fur-

ther books of his are in preparation. He has most assuredly done enough valuable work to be regarded as a scholar of first rank, and his labors are not yet completed. It appears that the much mooted temple library of Nippur is after all a reality in spite of the denial of Professor Hilprecht's enemies, for Dr. Radau is busily engaged in copying and editing its text. It remains to be seen how much our knowledge of the Orient, its history, culture and religion will be increased after their prospective publications appear. The first book in question is entitled *The So-Called Peters-Hilprecht Controversy* and contains two parts, first the Proceedings of the Committee appointed by the Board of Trustees of the University of Pennsylvania, secondly, Supplemental Documents, Evidence and Statement. It is published in Philadelphia by A. J. Holman & Company. The other publication is a mere pamphlet entitled *A Non-Partisan View of Professor Hilprecht's Work*, and contains two essays, the second being Professor Hilprecht's Views regarding the Nippur Tablets from the Standpoint of an Assyriologist.

The controversy has done very little good and so far as we can see only harm. If it contains a lesson, it is that we should try to overlook the attacks or insinuations made by one worker concerning the ability or even honesty of a colleague. It may then be hoped that similar occurrences will not be easily repeated.

THE SCOPE AND CONTENT OF THE SCIENCE OF ANTHROPOLOGY. By *Juul Dieserud, A. M.* Chicago: The Open Court Publishing Co., 1908. Pp. 200.

The author is a catalogue reviser on the staff of the Library of Congress, and the present book is the outcome of experience with the worries and perplexities which haunt the professional classifier. Mr. Dieserud is preeminently qualified for the task he has undertaken from his experience as classifier and later as librarian of the anthropological books at the Field Columbian Museum Library. In his introduction the author takes occasion to bring out a few salient landmarks in the evolution of the science of anthropology. Part I contains forty pages devoted to a study of the question, what anthropology is, and in this are discussed all the various phases of the science of man and the several lesser sciences into which it has been divided by different authorities. The next thirty pages are occupied with a careful scheme of classification which will prove invaluable to librarians. The largest part of the book contains a very comprehensive bibliography from the time of Magnus Hundt whose work was published in 1501, to 1905. In connection with each book, whenever possible, some idea is given of the treatment, either by quotation of the author's definition of his subject, or by list of contents or both. The appendix contains lists of "Anthropological and Ethnological Societies and their Publications," "Leading Ethnological Museums and Museums Containing Ethnological Collections," "Proceedings, etc., Examined of Anthropological and Scientific Societies," and "Periodicals Examined." An index to the authors enumerated in the Bibliography, completes the work.

THE NEW SCHAFF-HERZOG ENCYCLOPEDIA OF RELIGIOUS KNOWLEDGE. Edited by *Samuel Macauley Jackson, D. D., LL.D.*, in 12 volumes. Vol. I. New York: Funk & Wagnalls. Price per volume $5.00 (21s.)

The *Schaff-Herzog Encyclopedia* has been a comprehensive and indispensable reference book in the hands of all theologians and earnest students of

theological subjects since its completion in 1890. It is based upon Herzog's *Real-Encyclopädie für protestantische Theologie und Kirche*, of which the first edition appeared in 1868 complete in twenty-two volumes. Two volumes of this work were translated into English by the time of the outbreak of the American Civil War, which put a stop to the completion of the project. But in 1877 a condensed English translation was undertaken by Philip Schaff, and it is the third edition of this combined with an *Encyclopedia of Living Divines* which formed the familiar four volume Schaff-Herzog Encyclopedia. As the German work at its base had been overtaken by the time "S" had been reached, the Schaff-Herzog from that letter on was based on the first German edition, and much of it, therefore, is now antiquated. The present "New Schaff-Herzog" accordingly is an old work reconstructed. Its list of titles is largely the same and it follows the same general plan as in the old work. The points of dissimilarity, however, are these: (1) It contains much matter furnished directly by those contributors to the German work who have finally consented to condense their articles and bring them within the prescribed limits. These limits have often been narrow, but in no other way was it possible to utilize the German matter. It contains hundreds of sketches of living persons derived in almost every instance from matter furnished by themselves. (2) The matter in proof has been sent to persons specially chosen for eminence in their respective departments. (3) A much more thorough bibliography is furnished which attempts to give sources so that students may pursue a subject to its roots, to supply the best literature in whatever language it occurs, to supply references in English to those who read only that language. All articles based on German originals have been sent in proof to the writers of the original German articles when these writers were still living.

This edition is to be complete in twelve volumes and is absolutely the most recent and reliable as well as the most comprehensive reference book along theological lines now in existence and must not be confused with Bible dictionaries which were published many years ago, but are still sold as authoritative. The editor-in-chief of the new edition was one of the associates of the former work from its incipiency and 130 collaborators from the most eminent experts in the fields of religious knowledge of all countries have assisted in the compilation of the first volume which is now ready for distribution. The following statistical information with regard to the production of this work, taken from the publishers' announcement, may prove of interest to our readers:

Cost of production up to date	$250,000
Estimated number of topics treated	12,000
Number of specialist contributors engaged	600
Aggregate number of pages	6,000
Number of topics treated in Vol. I	892
Total number of pages in Vol. I	530

ehind the Scenes with the Mediums

By DAVID P. ABBOTT

:8 Pages, Cloth, Gilt Top - - - Price, $1.50 net

TABLE OF CONTENTS

THE OPEN COURT PUBLISHING CO., 378 Wabash Ave., Chicago

Spinoza and Religion

By

Elmer Ellsworth Powell

Professor of Philosophy in Miami University.

This book is accurately described on the title page as "a study of Spinoza's metaphysics and of his particular utterances in regard to religion, with a view to determining the significance of his thought for religion and incidentally his personal attitude toward it."

PRESS NOTICES

"Professor Powell has produced an exceedingly able and authoritative book. Few will read it without feeling that it settles for them the question of Spinoza's real attitude to God and to religion. And those who read it will obtain incidentally the benefit of a clear and consistent presentation of the whole philosophic system of one of the most difficult to understand of all the great thinkers of European history."

—*The Glasgow Herald.*

"It is a particularly illuminating exposition of the whole subject that is here given by Professor Powell . . . . A book of uncommon intelligence, acumen and carefulness of investigation."—*The Chicago Evening Post.*

"Altogether, Professor Powell makes out a good case for the main proposition, and his work is likely to affect current opinion as to the general position of Spinoza, in the course of religious thought. He will have to be counted with by every student of philosophy and religion, and should be specially studied by those who claim that Spinoza is specifically a Jewish philosopher."—*The American Hebrew.*

"Throughout the author demonstrates his familiarity with the field and his liveness of interest. The style, furthermore, is excellent."—*The Nation.*

"The book is clear in style, thorough in execution, and exhibits much logical acumen."—*Journal of Philosophy, Psychology and Scientific Methods.*

"L'analyse de la conception spinoziste de Dien lui fournit l'occasion de faire ressortir quelques-unes des obscurités les plus considerables d'un texte qu'il connait à fond et qu'il critique avec une remarquable sagacité."—*Revue Philosophique.*

"We have in this volume an able and impartial attempt to determine, first, what Spinoza taught and, second, how this teaching relates itself to religion."

—*The Princeton Theological Review.*

Pp. xi + 344, Price, cloth $1.50 net (7s. 6d.)

THE OPEN COURT PUBLISHING CO.
378-388 WABASH AVENUE :: :: :: CHICAGO, ILL., U. S. A.

BOOKS ON CHINA, IT'S PHILOSOPHY, RELIGION, LANGUAGE, LITERATURE, LIFE AND CUSTOMS. : :

T'AI-SHANG KAN-YING P'IEN, Treatise of the Exalted One on Response and Retribution. Translated from the Chinese by Teitaro Suzuki and Dr. Paul Carus. Containing Chinese Text, Verbatim Translation, Explanatory Notes and Moral Tales. Edited by Dr. Paul Carus. 16 plates. Pp. 135. 1906. Boards, 75c net.

"The book is not only interesting, but instructive as well, and should have a place in every religious or philosophical library."—*The Tyler Pub. Co.*

YIN CHIH WEN, The Tract of the Quiet Way. With Extracts from the Chinese Commentary. Translated by Teitaro Suzuki and Dr. Paul Carus. 1906. Circa 50 pages. Boards, 25c net.

"This is a short Chinese tract containing many noble ethical sentiments, inculcations of charity, truthfulness, nobleness of character, and other features."—*Methodist Book and Pub. House.*

LAO-TZE'S TAO-TEH-KING 老子道德經 Chinese-English. With Introduction, Transliteration, and Notes. By Dr. Paul Carus. With a photogravure frontispiece of the traditional picture of Lao-Tze, specially drawn for the work by an eminent Japanese artist. Appropriately bound in yellow and blue, with gilt top. Pp. 345. Price, $3.00 (15s.).

Contains: (1) A philosophical, biographical, and historical introduction discussing Lao-Tze's system of metaphysics, its evolution, its relation to the philosophy of the world, Lao-Tze's life, and the literary history of his work; (2) Lao-Tze's *Tao-Teh-King* in the original Chinese; (3) An English translation; (4) The transliteration of the text, where every Chinese word with its English equivalent is given, with references in each case to a Chinese dictionary; (5) Notes and Comments; (6) Index.

"Allow me to congratulate you on your capacity for seeing into mill stones. It is truly phenomenal."—*Rev. Arthur H. Smith, American Board Mission.*

"It goes without saying that the task of obtaining sufficient acquaintance with the Chinese language to translate, under the conditions named, a book like that of Lao-Tze is a gigantic one. Dr. Carus's success is little short of marvelous. He frequently cites the versions of others, but in the extracts given, it seems clear that Dr. Carus has succeeded better than Dr. Legge or Dr. Chalmers in the passages where we are apt to compare them—a very remarkable fact indeed."—*North China Daily News.*

THE CANON OF REASON AND VIRTUE (LAO-TZE'S TAO-TEH-KING). Translated from the Chinese by Paul Carus. 1903. 25c, mailed 28c. (1s. 6d.) Pp. iv, 138.

THE CHINESE LANGUAGE AND HOW TO LEARN IT. A Manual for Beginners, by Sir Walter Hillier, K. C. M. G., C. B. A new Chinese grammar has appeared which, as we learn from private sources, is being used officially by the English authorities for the preparation of their candidates for office in the English colonies of China. Pp. 263. $3.75 net.

"I think Hillier's book a great improvement on all that has been published in this direction, not excepting Sir Thomas Wade's celebrated 'Tzŭ-êr-chi,' and I propose to recommend it to my own students as well as to the outsiders who every now and then apply to me for advice in their studies."—*Friedrich Hirth, Columbia University, New York City.*

CHINESE PHILOSOPHY: Being an Exposition of the Main Characteristic Features of Chinese Thought. By Dr. Paul Carus. Pp. 64. Numerous diagrams and native characters and illustrations. Second edition. 25 cents (1s. 6d.), mailed 30 cents.

"Valuable and of unquestioned reliability. The delineation of the philosophy that underlies the Chinese civilization is so ably done in these pages that the reader cannot fail to appreciate the causes which produce Chinese conservatism."—*Toledo Blade.*

CHINESE THOUGHT: An Exposition of the Main Characteristic Features of the Chinese World-Conception. By Paul Carus. Being a continuation of the author's essay, Chinese Philosophy. Illustrated. Index. Pp. 195. $1.00 net. (4s. 6d.)

"The essential sanity and goodness of the Chinese character receives an appropriate tribute and its very faults are set forth as rather misapplied virtues than anything widely varying from our own conceptions of right and wrong."—*The Chicago Daily News.*

CHINESE LIFE AND CUSTOMS. By Paul Carus. With illustrations by Chinese Artists. Pp. 114. 75c net. (3s. 6d. net.)

"With each of the reproduced illustrations goes the explanation needed for complete understanding, whether the picture be one of the gods, of the celebration of a religious festival, of the planting of rice, or of boys in school. In this way nearly the whole of the life of the Chinese people finds exposition, and the western man can follow his cousin into his home and through his entire days on earth with ready comprehension."—*The Chicago Daily News.*

CHINESE FICTION. By the Rev. George T. Candlin. With illustrations from original Chinese works, specimen facsimile reproductions of texts, and translations of representative passages. Giving a clear and vivid *résumé* of Chinese romantic literature. Pp.. 51. Paper, 15 cents (9d.), mailed, 18 cents.

"A list of 'fourteen of the most famous Chinese novels' is given. Many long quotations from plays, poems, and stories are given, and the pamphlet is a source of great pleasure. The pictures, too, are charming."—*The Chicago Times Herald.*

The Open Court Publishing Co.

P. O. Drawer F. **378-388 Wabash Ave., Chicago, Ill.**

PRESS NOTICES AND INDIVIDUAL OPINIONS OF

A SCRAPBOOK OF Elementary Mathematics

NOTES, RECREATIONS, ESSAYS

By WILLIAM F. WHITE, Ph. D., State Normal School, New Paltz, New York.

FRONTISPIECE AND 60 DIAGRAMS AND OTHER ILLUSTRATIONS

12 mo. 248 pp., cloth binding, gilt top, price $1.00 net. (5s. net.)

"IN THIS BOOK MATHEMATICS IS PRESENTED IN LITERARY FORM."

The following individual opinions are from letters written to the author and have reference to sections of the book as they appeared as magazine articles. Except where the plural is used, they referred only to the story "Alice in the Wonderland of Mathematics," the only article that had then appeared.

FROM THREE OF AMERICA'S FOREMOST MATHEMATICIANS

Gems

"These gems of yours from the Open Court. They delight me."
— *George Bruce Halsted.*

Vital interest

"I read them and enjoyed doing so. I heartily congratulate you upon your success . . . I always take time to look into things that come from your pen. I know that I shall find something of vital interest in them."
— *David Eugene Smith.*

Knew where to stop

"I congratulate you most heartily. I do not see where it could be improved. You knew where to stop as well as where to begin."—*James M. Taylor.*

FROM OTHERS BEARING WELL-KNOWN NAMES

Charming essays

Dr. Ernst Mach, professor in the University of Vienna, recently called the greatest of living scientists, began his letter:
"In einem Ihrer reizenden Aufsätze."

Very ingenious

Prof. W. H. Crawshaw, author of *The Making of English Literature:*
"Very ingenious and withal decidedly interesting."

Imagination with technical studies

Prof. Albert Perry Brigham, author of *A Text-book of Geology, Geographic Influences in American History, From Trail to Railway, etc.:*
"'Alice in the Wonderland of Mathematics,'—a pretty illustration of the value of joining the imagination with technical studies."

A facile pen

R. P. Williams, author of the books on chemistry and a departmental editor of *School Science and Mathematics:*
"You wield a facile pen . . . The Open Court reprints are very interesting and instructive."

More roses and fewer thistles

Washington Irving, nephew of "the first American man of letters":
"In the study of mathematics, had I had such a guide as you, I am certain I should have found more roses and been stung by fewer thistles."

First mathematics I ever enjoyed

Also one from a former college president, now a real estate dealer:
"The first mathematics I have ever enjoyed, except figuring up interest money. It is splendid."

REVIEWS OF THE BOOK

A keen insight into the beauty of applied mathematics

"The book is unique in its presentation of problems and theories and a number of short methods are explained. The book treats of arithmetic, algebra and geometry and the illustrations are for the most part drawn from the scientific, commercial and industrial activities of the day. Properly speaking it is not a text-book but a keen insight into the beauty of applied mathematics as a study."
—The *Colgate Madisonensis*, Colgate University, Feb. 11, 1908.

An amusing and breezy element

"Professor William F. White, Ph. D., of the mathematical department of the State Normal School at New Paltz, N. Y., has published, through the Open Court Publishing Company, a volume entitled *A Scrapbook of Elementary Mathematics*. The 'science of numbers' is usually regarded in the light of a dry and serious pursuit. But Mr. White infuses into it an amusing and breezy element which shows that even so prosaic a subject has its lighter side, and that, too, without sacrificing the mathematical rigor which necessarily pertains thereunto. ($1.)"

—The *Examiner*, N. Y. Department of Literary Notes, March 12, 1908.

A long-felt want

"The book is interesting, valuable and suggestive. It is a book that really fills a long-felt want. It is a book that should be in the library of every high school and on the desk of every teacher of mathematics."

—*The Educator-Journal.*

The following extracts from the table of contents will serve to indicate the nature and scope of the book:

THE OPEN COURT PUBLISHING COMPANY

378-388 Wabash Avenue, Chicago

Date.....

THE OPEN COURT PUBLISHING COMPANY
378-388 Wabash Avenue, Chicago, U. S. A.

Gentlemen:—Please send me a copy of the "SCRAPBOOK OF ELEMENTARY MATHEMATICS," for which I enclose $1.00.

.....

.....

Remittances may be made by Express or Postal Money Order, or by drafts on Chicago or New York. When paying by personal checks add 10 cents for collection charges.